The Geographical Journal

Vol. LXII No. 4 October 1923

JAUF AND THE NORTH ARABIAN DESERT

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Read with the following paper at the Meeting of the Society, 12 February 1923. Map follows page 320.

IT is a great pleasure to me to comply for the third time with a request from the Royal Geographical Society for a paper on my experiences in Arabia, and my only regret is that the necessity of being at my post on the north-western fringe of the great Arabian peninsula prevents me from being present in person to communicate this paper. Major Holt, with whom I made the journey which I am to describe, has, however, kindly undertaken to act as my proxy before you in addition to reading his own paper, which I understand will deal more fully with the technical aspects of our journey from the point of view of a railway engineer. No one is more competent, I may perhaps be permitted to say, than Major Holt to talk about the engineering possibilities of the desert, for he came early in 1922 to my headquarters at Amman in Trans-Jordan after several years spent in an exhaustive study of the desert-railway problem on a line extending east to west from the Euphrates at Hit and Ramadi to the Hejaz Railway near Amman. I was at the time contemplating a visit in the ordinary course of my political duties to the famous oasis of Jauf, and Major Holt jumped at my suggestion that he should accompany me thither to study the railway possibilities of the depression of Wadi Sirhan. There would, however, have been no justifiable occasion for writing this paper had not our "studies," after an exasperating series of failures and trials, eventually carried us beyond Jauf itself across the wilderness to the Mesopotamian border at Karbala.

Our first attempt to reach Jauf was a failure. Major Holt had just piloted a party across the desert from Ramadi viâ Azraq to Amman, following for the most part the well-marked line of the air track used by the Cairo–Baghdad air mail. He had with him a number of specially fitted Ford cars, and it was with some of these that we decided to make the attempt as far as the oasis of Kaf near the head of Wadi Sirhan, trusting there to collect camels and an escort for the rest of the journey. We left Amman on 10 March 1922 with three cars, and on the following

day picked up Mithqal Pasha, chief Shaikh of the Bani Sakhr tribe, with one car at his black-tented camp on the edge of the desert in the neighbourhood of Ziziya station on the Hejaz Railway. At this point we were roughly some 25 miles from Amman and 80 miles from our first objective—Kaf.

We started off again on the morning of March 12 in two parties: the first, consisting of the four cars, arrived at Kaf at 4 p.m. on the following day, while the second, consisting of Mithqal's attendants mounted on camels, arrived at our destination no less than twelve hours before we did. They travelled of course during the night as well as by day, while we had to camp for the night, and moreover we were without the services of Major Holt's trained British mechanics, as I had deemed it advisable to keep the British element down to a minimum—in fact, our two selves. To anticipate the course of events, we had a similar experience on our return journey, the camels reaching camp within half an hour of the cars on a six hours' run. I note these matters to justify my personal preference for camels over mechanical transport in the real desert—that is to say, in country where no organized route exists. With proper—and expensive—organization mechanical transport can beat everything else, but the superiority of the camel lies in the fact that no organization whatever is necessary, plans can be left to depend on circumstances, and one is untrammelled absolutely.

The desert country between the Hejaz Railway and the Wadi Sirhan depression calls for little comment. In former times—notably under Roman rule and again in the days of the Umaiyid dynasty of Damascus—it was more prosperous than now. The rainfall must have been heavier certainly in Roman times, for the line of cultivation extended further east than it now does; while the numerous hunting-boxes of the Damascus Caliphs are ample evidence that game was abundant, where now an occasional gazelle or bustard is all that may be met with in a long day's march. The introduction of modern firearms has been a curse and veritable scourge to Arabia and its independent, individualistic denizens. There is no law here for the protection of game, and nobody would respect it if there were; but, worse still, the Arab social code of raid and rapine has not shown any signs as yet of adjusting itself to the sudden change which has come over the desert with the advent of the modern rifle. If the necessity for such an adjustment is not realized soon, Arab society will decimate itself in a short space, but I should perhaps modify this somewhat sweeping generalization. Every crisis must produce a cure, and, though the northern desert of Arabia is at the present moment unsafe in the widest sense of that term—unsafe for the innocent traveller, the merchant, and the shepherd—there are already signs of a welcome change in the south, where Ibn Sa'ud has created a well-knit polity on a religious basis and has found himself strong enough to prohibit tribal raiding within his borders. Those borders are gradually creeping

further northwards and already march with 'Iraq and Trans-Jordan. It is only beyond them that the lives of the faithful are in jeopardy, while within them those who reside as of right, acknowledging the rule of Ibn Sa'ud, and those who travel with his permission and protection are safe.

My main object in making this journey was to investigate the actual political situation at Jauf, which was exceedingly obscure, and it may be convenient to take a general survey of the position before proceeding with the narrative of our experiences. The fortunes of Jauf have oscillated violently since the 'sixties of last century, when, it would seem, Faisal ibn Sha'lan, the first of his house to occupy the district, seized it from the Ibn Rashid dynasty of Haïl. The Sha'lan occupation appears then to have lasted for about twenty years until the great Muhammad ibn Rashid recovered Jauf and added it to his empire, which before his death embraced practically the whole of Central Arabia. His successor, 'Abdul'aziz, was unable to preserve the integrity of his frontiers against the growing power of his namesake, 'Abdul'aziz ibn Sa'ud, the present Sultan of Central Arabia; and his losses in the south were followed in the north by the loss of Jauf about 1906 to Nawwaf ibn Nuri, a scion of the collateral branch of the Sha'lan family. Nuri who had become paramount Shaikh of the Ruwalla tribe by murdering his brother, Fahad, appears to have contented himself with the position of chief of the Badawin and to have left the settlements of Jauf and Sakaka to the governance of his son, Nawwaf, who seems to have ruled the somewhat difficult citizens thereof with wisdom and moderation until about 1920, when Haïl again asserted its claim to suzerainty over the northern oases, and Sa'ud, the reigning Amir, was able to attack Sakaka with the treacherous collusion of a member of the premier family of the town, Hamad ibn Muwaishir. The slave governor, left by Nawwaf to administer the town, was treacherously murdered and his signet-ring of office sent to Sa'ud, who proceeded to occupy the whole district after some desultory fighting. Meanwhile Ibn Sa'ud had been carrying on a desultory campaign against Haïl since 1918, and Sa'ud himself was murdered early in 1921 by a treacherous relative, being succeeded by 'Abdullah ibn Mit'ab. The summer of 1921 witnessed some intensification of Ibn Sa'ud's campaign, and the position became so uncomfortable that 'Abdullah abandoned his post to his cousin, Muhammad ibn Talal, and was given an asylum at Riyadh by Ibn Sa'ud. Muhammad was forced to surrender Haïl and led captive to Riyadh in August of that year, and Ibn Sa'ud added the Shammar Amirate to his dominions. Not the whole of it, however, for in the same month, Nawwaf having died prematurely in Syria during the summer, Sultan, his son, assisted by his cousin, Mujhim ibn Sha'lan, marched down to Jauf and occupied the district without serious opposition. Hamad ibn Muwaishir was punished for his former treachery by being deprived of his lands and other pos-

sessions, and thus by the beginning of 1922 the Jauf tract, after many vicissitudes, seemed to have settled down to its old allegiance to the Sha'lan family, while their former rivals, the Rashid dynasty, had ceased to exist.

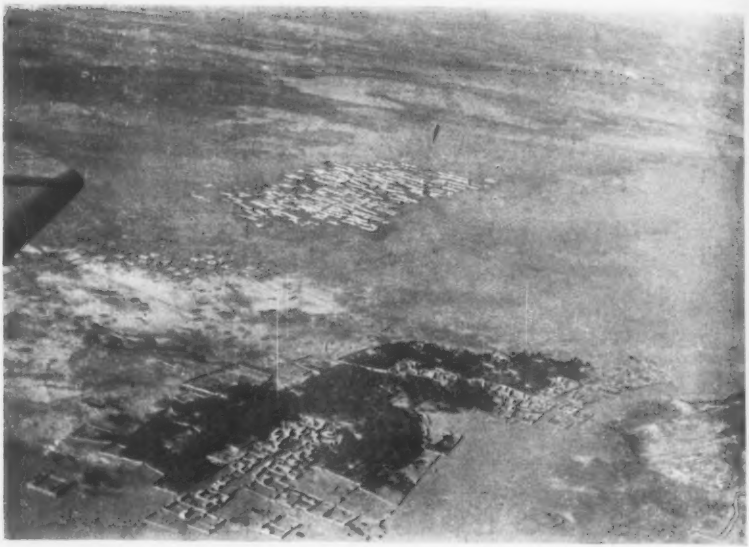
From the Sha'lan point of view that was the position. But Ibn Sa'ud had his own view of the matter—namely that, having destroyed Ibn Rashid, he was the natural heir to the dominions which Ibn Rashid had formerly ruled. In favour of his view was firstly the consideration that he was in a position to enforce it if challenged, and secondly the fact that the majority of the people of the Jauf settlements were for him—not so much for him, perhaps, as against the Sha'lan, to whose unfitness to rule over Jauf, or anywhere else for that matter, Major Holt and I are more than ready to bear witness in support of the unfortunate citizens of the settlements in question. Meanwhile rumour, taking its colour, of course, from the various sources from which it emanated, represented Ibn Sa'ud as being in varying degrees in effective possession of Jauf and its environs, and Nuri ibn Sha'lan alternately as having done obeisance to his new overlord and as having defied the would-be intruder. It was clear that we should not arrive at the truth of the matter except by personal investigation, and it was of some importance to know the truth—Trans-Jordan and its ruler, the Amir 'Abdullah, being vitally interested in the affairs of its near neighbour and their possible consequences to themselves.

And so after a journey, made exasperating by a fair selection of the troubles to which cars in general are subject but otherwise without incident, we came to Kaf, the most important of a group of villages situated in this section of Wadi Sirhan and known collectively as Quraiyat al Milh—the salt hamlets. The name is taken from the only industry of the locality, for the whole area is a collection of salt-pans in the bed of the Wadi under the lea of the limestone and basalt cliff which divides it sharply from the broad strip of lava-covered hills extending from Jabal Druz in the north to a point about 50 miles south of Kaf. These salt-pans are worked by the Badawin on payment of a fee of 2 majidies per camel-load to the local owners of the pans and a royalty of a similar amount to Nuri ibn Sha'lan, the acknowledged overlord of these villages. The salt, which thus costs 4 majidies per camel-load at the pans, is mostly sold in the villages of the Hauran—a journey of three or four days—at a charge of 20 majidies a load; it is extracted by the simple process of evaporation, the surface of the soil being dug out in small rectangular pits about a foot deep; the sub-soil water thus exposed slowly evaporates, leaving a solid residue of white salt of fair quality, which is taken out and piled up in little pyramidal mounds against the coming of the carriers. Seen from the air, as I saw them frequently during August and September when we at Amman had many alarums and excursions arising out of Wahhabi activities, these salt-heaps look

ARCH AND RESERVOIR, QASR AMIJ

VOLCANIC CONE OF JABAL MAQALL, NEAR KAF

KAF FROM THE NORTH-WEST



KAF AND THE SALT-PANS FROM THE AIR

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for all the world like white bell-tents and, collectively, like a vast encampment; indeed, they stand out so prominently in the scene that the dark palm patch and drab village of Kaf itself near by almost escape notice.

So much for the salt of the Quraiyat villages. In other respects Kaf, which may be taken, though the most important, as typical of them all, shows all the characteristics of a typical village of Nejd. Northward of Ma'an, which with the settlements south of it on the railway line, should be counted to the Hejaz, Trans-Jordan has characteristics of its own differentiating it from Arabia. It is a high rolling plateau country with vast stretches of cornland and even vaster possibilities of development in this direction; its proximity to Palestine, its road to Jerusalem, and its railway from Haifa and Damascus class it in the modern world; moreover it has no palms and its village life is that of Palestine and Syria—squalid and unattractive. But at Kaf and its subsidiary settlements we plunge into the depths of Arabian civic life; the visitor is admitted as of right to the benefit of the three-day rule of hospitality; the rule of respectable life is unadulterated idleness, whose monotony is varied only by punctual attendance at the five daily prayers, excursions to the houses of neighbours to drink coffee, and attendance at the evening and morning *levées* of the local governor outside the wall of the fort-like structure in which he resides. Many of the citizens of Kaf and its villages were formerly denizens of Central Arabia; the governor at the time of our visit (since deposed) had left Buraida to come here forty years ago; the local Qadhi was from the same town, which he left fifteen years ago seeking repose from the growing vigour of the Wahhabi revival, as he told me; many there are here from 'Anaiza and other Qasim centres; but the most recent arrivals are perhaps the most noteworthy—a band of some ten or twelve Wahhabi enthusiasts who have settled here with the professed object of spreading the true faith and no one says them nay. They have not yet succeeded in stopping the practice of smoking, but I make no doubt that the Quraiyat settlements will in their due course lapse through pure inertia into a creed and rule of life which are so admirably adapted to their character and requirements.

Our reception by the authorities of Kaf was cordial enough though guarded. We had thought it best not to give notice of our coming beforehand, and the car we sent ahead to announce our arrival when within sight of Kaf—certainly the first car to enter the oasis—was the first news the governor had of our projected visit. Holding his post at the pleasure of Nuri—doubtless he sent off word of our arrival to his master at once—he dared not accommodate us in the matters in which we required his help. We were not allowed to visit the natural fortress on the top of an isolated lava-capped hillock, called Qasr Sa'idi, overlooking the oasis, in which is stationed a small guard of some twenty-five men with machine guns, a striking provision of nature for the defence of the locality, for every road leading to Kaf is commanded by this eminence and all

arrivals are brought sharply to a halt by a shot or two from the garrison and move on at their peril until their business is known. We were also not permitted to enter the governor's fort-residence, built only a year before at the foot of the hillock above mentioned and known as Qasr Nuri. Otherwise we were made reasonably free of the place to visit its surrounding ridges, whence a fine view of the basalt country and volcanic cones to the eastward is obtained, and the copious somewhat sulphurous springs which provide the inhabitants with water and the palms with nourishment. These springs issue from the ground quite close to the surface, and the irrigation of the palm groves is a matter of no difficulty.

But of all things we wanted the governor's help in procuring us camels and attendants for the onward journey to Jauf, and it is perhaps unnecessary to relate the exasperating details of our negotiations with the local authorities, which ended with our three days of free board and lodging in complete failure and in our return to Amman. To tell the truth our own companions—Mithqal Pasha, whom I have already mentioned, Haditha al Khuraisha, another important Bani Sakhr chieftain, and Ghalib Pasha, a swashbuckling general who had served with the Turks at Medina during the war and was now in the service of the Amir 'Abdullah—had so little stomach for the matter in hand—a visit to Jauf, which was reputed to be the centre of Ibn Sa'ud's military activities—that they exerted themselves to the utmost to dissuade the governor from giving us any facilities, while coming to us with tales of their heroic efforts against odds to win over the governor to our side. To cut a long story short our efforts failed, and we arrived back at Amman on March 18 after a three-day journey, whose only incident of note was our meeting with an ancient member of the Bani Sakhr, who claimed to be 120 years old and to remember as a young man the operations of Ibrahim Pasha in these parts during the 'twenties and 'thirties of last century. Incidentally Kaf itself is said to have been destroyed by him.

Our experiences during this visit only served to whet our appetite for more, but we determined to set out next time on camels and thus be free, if necessary, to circumvent the Kaf authorities. But now fortune began to treat us more kindly and it was with much gratification that, about the end of April, I received letters from Nuri's representatives at Jauf—his young grandson, Sultan, and his cousin, Farhan ibn Mashhur—explaining their regret at not having known of our previous visit to Kaf in time to make arrangements for our onward journey, and their hope of our visiting them at an early date.

We did not need a second invitation and all was ready, camels, escort, etc., on May 2, when we gathered at Mithqal Pasha's tent at Manshiya close to the railway line. The next day we reached Haditha's camp by the Roman ruins of Muwaqqar, about 21 miles from Amman by road. Here we were met by emissaries from Kaf, now all smiles

and enthusiastic to help us in every way, and hence we started off on the morning of May 4 in full strength towards the prominent landmark of Kharana, a well-preserved specimen of an Umaiyid hunting-box. That evening found us camping in Shaib Shanmari, a shallow drainage channel trending eastwards from the Muwaqqar watershed towards Wadi Sirhan. The following day we arrived at the wells of 'Amari at the eastern edge of the Sirhan depression and spent the night with a section of Ruwalla. May 6 saw us back again at Kaf, where we were warmly welcomed by no less than six members of Nuri's family, the most important of whom were Mujhim ibn Sha'lan, Farhan ibn Mashhur, and Faraj ibn Sha'lan. We dined as a matter of course with our hosts within the precincts of Qasr Nuri, but it should be noted that it was now the month of Ramdhan, a fact which resulted in our having to go on short commons during the daytime, though in Nejd the traveller-guest would not have been allowed to realize from his own treatment that his hosts were fasting according to the law.

It was however not in this matter alone that our present hosts disappointed us. From this moment onwards, though we can look back with some satisfaction on the successful achievement of the main objects of our journey beyond our reasonable expectations, the story of our dealings with the house of Sha'lan was one of constant wrangling and disappointment, bickering and bribing, chiding and cajoling and deception. Without shame we may confess to the joy with which, within a month of our sojourn at Jauf, we heard of the downfall of the house of Sha'lan at the hands of Ibn Sa'ud. As rulers they were detested by their own people, whom they treated with insolent harshness, while as hosts we had ample proof of their unfitness to be classed among the Arabs. As princes of the Arabian borderland they have trafficked too long with Syria and have drunk too deeply of the golden stream, which we poured out during the war, to have retained the Badawin virtues to which they are heirs by blood.

The news from the Jauf district which we now had from our hosts was far from reassuring. Hamad ibn Muwaishir, of whom I have already spoken, had been pardoned soon after his punishment and fully reinstated in his properties, but this act of weakness on the part of the Sha'lan was soon to prove their undoing. Hamad, nursing his resentment rather than feeling gratitude for his lenient treatment, had lost no time in offending again by evading an edict of Nuri for the effective disarmament of the people of Sakaka and Jauf, and was denounced as having concealed a large store of arms and ammunition under the floor of his residence. Called upon to surrender his arms and submit to punishment, he raised the standard of revolt in the name of Ibn Sa'ud and the Wahhabi faith and shut himself and his considerable following in behind the walls of his gardens and fortress-residence at the western end of the Sakaka oasis. This had actually happened only ten days

before our arrival at Kaf, and, Sultan having occupied the eastern hamlets of the oasis with a view to besieging the rebels into submission, while Jauf itself remained outwardly loyal under its slave-governor, Daujan, watching events, Mujhim and Farhan had hastened to meet us with a view of enlisting our assistance in the Sha'lan cause.

But Mujhim and his fellows, always thinking back to the war period rather than forward to the fate awaiting them, imagined we had come to sow their deserts with gold and to place all the resources of the British Empire at their disposal. They agreed to take us to Jauf on condition of our sending for aeroplanes and armoured cars to support the expedition. We maintained that we could not on any account undertake a military demonstration until we had examined the situation at Jauf on the spot and satisfied ourselves of the feasibility of the roads leading thither for mechanical transport. We were also anxious to examine the railway possibilities of their country—hence an expert engineer among our party. Mujhim was the senior member of the family present, though Farhan had actually been named by Nuri to conduct business with us. With either alone we might have been able to drive a bargain with a straight bribe, or we might have played one off against the other at the price of a written promise that that one should specifically participate in the substantial subsidy, which they imagined His Majesty's Government to be desirous of conferring on them collectively in perpetuity ; but in the long run the discussions ended in a deadlock and the matter had to be referred for the orders of Nuri, then located at a distance of two days' journey northward on the confines of Syria.

We possessed ourselves in patience during the four days of Mujhim's absence, for he did us the honour of carrying our message to Nuri himself, and he returned with Nuri's permission for us to go on to Jauf and with a letter appointing himself to continue negotiations with us in supersession of Farhan. I had the pleasure of twitting Farhan on his failure to win our favour and on the loss of his job, but, thinking him more likely to be useful to us than Mujhim, I promised to make it good to him if he now arranged to accompany us to Jauf and serve us without further deception. This was duly arranged and everybody was in a good temper.

On the afternoon of May 13 we left Kaf to spend a day at Mujhim's camp at Minwa, only some 6 miles distant and near the second biggest settlement of the Quraiyat, namely Ithra. Here in a great plain we saw in their hundreds the black tents of the Ruwalla and the more squalid brown booths of the Shararat, a large and well-known tribe occupying an inferior position in the scale of Badawin society. Here too we saw in thousands the Ruwalla camels at the watering of Minwa, while we spent the whole of May 14 in a little excursion to the volcanic crater of Maqqal to the northward, from whose summit we had a wide and splendid view of the lava country all round. We lunched at Ithra on our return journey, seeing the remnants of a large building constructed of basalt

blocks, some of which had inscriptions and figures in low relief. Other petty settlements in this neighbourhood are Washwash and Qarqar, the characteristics of all these villages being exiguous palm groves, ruinous mud buildings, salt-pans and sulphurous water, the water of Ithra being particularly copious and issuing from springs.

Our start was fixed for May 15, but we had yet to experience an exhibition of the true character of our hosts. On the night of the 14th, while we were preparing for bed in view of an early start on the morrow, Mujhim appeared with his clerk in attendance and produced the draft of a "treaty," which, he explained, had to be signed as a condition of our departure. Discussion would only lead to delay, while I knew full well that the "Treaty of Minwa," the terms of which it is perhaps unnecessary to disclose, would never commend itself to His Majesty's Government. I was not however in the mood to consider the niceties of diplomatic procedure and I signed—as it happened it was most fortunate that I did so. The treaty was duly repudiated by the British Government, not however until the house of Sha'lan had ceased to be an independent power, and we not only visited Jauf, etc., without having to pay a penny in bribes, but were spared the pain of being present at the battle of Minwa, which took place within thirty-six hours of the signing of the treaty and in which Mujhim and his family made amends for their scurvy treatment of their guests by very gallant behaviour in the field against the Wahhabi host, which fell upon them unawares at dawn on May 16 and was heavily defeated, its leader and a standard being captured.

Meanwhile on the morning of May 15, Farhan having at the last moment been superseded in charge of our party by Faraj, who had implicit instructions to take us to Jauf and bring us back to Mujhim without delay, we set forth for Jauf. Our course lay southward through the broken hill country of the Quraiyat tract until we crossed a sluggish salt stream (Sha'ib 'Aqiq al Milh) and passed into the Wadi Sirhan depression again. Thence we steered south-south-west to the wells and ruined grange of Al Ghatti, where we passed through a large encampment of Shararat. Some voices were now raised in favour of spending the night here, while we pressed for the continuance of the march to the watering of Baidha some 10 or 12 miles straight ahead, but fortunately neither set of counsels prevailed. Our leaders were all agog with nervousness about the vaguely reported activities of the Wahhabis, and finally their fear got the better of them to such an extent that nothing could dissuade them from deflecting their course due east to the wells of Qaraqar, a desolate spot well within the folds of the hill country to the east of Wadi Sirhan, where we camped for the night.

That night a large force of Wahhabis camped at the watering of Baidha; next day at dawn they annihilated the Shararat encamped at Al Ghatti and passed on to Minwa, where they were defeated in a battle royal by Mujhim and his men. So by a series of flukes we missed several

opportunities of disaster and passed on to Jauf blissfully ignorant of the tragedies being enacted behind us, and it was not till we had safely arrived there that we had news of them. The Wahhabis had worked up from the depths of Central Arabia, a distance of some 700 or 800 miles, round the western flank of the Great Nafud, and, while it is impossible to say what may have been their numbers—perhaps 500 or 600 in all—some 200 of them perished at Minwa and the fate of the survivors is unknown. It is curious that we saw no signs of their retreat on our course, for they must have travelled very much faster than we were doing, and it is not unlikely that the majority of them lost their way and perished miserably of thirst. Such was the first warning we had of the definite approach of the Wahhabi menace to the borders of Trans-Jordan.

Our intention, when leaving Minwa, had been to march as far as possible down the depression of Wadi Sirhan with a view to finding a suitable line for railway or road development in case of need, but the fears of our companions had brought us abruptly out of the Wadi into the unsuitable hilly country to the east, and at Qaraqar, though we had actually marched about 21 miles, we were not more than 11 or 12 miles distant from Minwa in a straight line. Next morning we pressed for a return to the Wadi, but nothing could induce our companions to agree to this, and we had to content ourselves with the negative conclusion that the country over which we marched for nearly 30 miles during the day was devoid of railway or road possibilities. Basalt ridges and hummocks succeeded each other with wearying regularity, and we spent the night close by a volcanic cone called Buraik, from whose summit we had a splendid view of the country. Not far south of this point the lava country comes to an end, and, marching next day with the vast dazzling white salt-marsh of Nuqrat al Hadhaudha away on our right in the Wadi, we came after about 15 miles to water at the numerous wells of Ma'asir scattered about an extensive limestone basin, the water appearing almost at the surface level in cracks of the rock. The salt-marsh, lying on a slightly lower level than this basin, extends for many miles north and south and is a species of quagmire rendering a long basalt outcrop in its midst an unapproachable island, on which Arab imagination and legend have located a valuable treasure. Attempts to reach it have been the cause of many deaths in the treacherous bog.

Our next objective was the watering of Nabk abu Qasr, so called from the remnants of a former mud fort still visible on the edge of the circular depression, in which water lies in a number of shafts about 18 feet deep. The distance from Ma'asir to Nabk abu Qasr was about 35 miles over a vast limestone plain with a good firm surface, on which we came across the tracks of ostriches, though we never had the good fortune to encounter any of these creatures in the flesh (except a few we saw in captivity at Jauf) during the whole of our journey.

Nabk abu Qasr lies at the edge of Wadi Sirhan, which contains a

considerable number of waterings in this section, and from it we proceeded hugging the eastern bank of the depression across heavy sand-ridges which appear to extend most of the way across the valley. Negotiating these we came on the night of May 18 to Wadi Ma'arik, an affluent of Wadi Sirhan from the high country to the eastward. Next day we marched in an easterly direction away from the Sirhan trough ascending into the uplands, in which we encountered a minor adventure, for, as we rounded a hill lying across our path, our leaders espied and gave chase to three camel-riders, who immediately put their camels to a gallop up the hillside and escaped in safety. Every human being seen in the desert is an enemy, and the weaker party must make its best speed away if it would escape death.

We reached the crest of the uplands in the late afternoon and looked across the wide plain below us to the golden-red sands of the Great Northern Nafud reflecting the red sunset behind us. A hundred miles and more this sea of sand-billows extends southward to the north fringe of the Shammar territory whose southern boundary I had just touched at Qusaiba in 1918. In the plain before us, where the sandstone comes to the surface from beneath the cretaceous limestone of the country we had left behind us, lies the wide depression of Juba with its prosperous settlements of Jauf, Sakaka and their subsidiary villages, but we were already late and had to leave our entry into Jauf till the morrow, camping meanwhile at the edge of the plain.

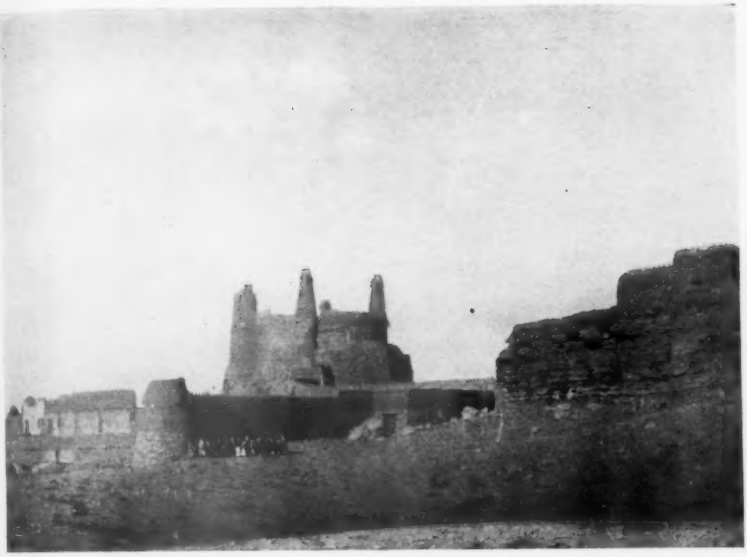
The Juba depression has often been spoken of as an ancient sea or bay with the limestone encircling it, but if, as seems to me the case, the sandstone of this tract, like that of Petra and the neighbourhood of the Tubaik hills, dips under the limestone, it would be more correct to speak of the Juba as having been part of a land area washed on the north by the Cretaceous sea. The reason for its lying now below the level of the Cretaceous limestone would seem to be that the sandstone has worn away more rapidly under exposure than the hard flint cap of the limestone area. Wadi Sirhan, in spite of its appearance on the map, has apparently no geological connection with the Juba depression. Fossils, which I brought home recently from this area, indicate that the western bank of the Wadi is Pliocene while the centre and eastern fringe is Eocene, the western desert north of the latitude of Petra–Jauf being Cretaceous, while the eastern lava tract is presumably of comparatively recent origin as it overlies rocks similar to the Eocene rocks of the Wadi. South of the Great Northern Nafud and the Shammar district with its granite ranges we come to the Jurassic beds of Nejd. The sandstone of the Jauf–Tubaik–Petra area is presumably therefore early Cretaceous, or at any rate intermediate between the Cretaceous and Jurassic limestones, but I regret that all my efforts to find fossils in the sandstone area were without result.

On May 20 we were up betimes to march on Jauf, now some 20 miles

distant. The rebellion of Ibn Muwaishir had begun about three weeks before, and anything might have happened in the interval, so we had taken the precaution of sending messengers ahead overnight to spy out the land. They met us on our arrival within a few miles of the oasis with news that all was still well, though the rebels, despairing of holding out indefinitely at Sakaka, had sent a deputation to Ibn Sa'ud to seek his help. Jauf was still loyal, awaiting the result of the Sakaka rising.

In a short time we were at the edge of the depression and descending the rough path down to it. Jauf itself could not be seen from here, but we soon came to the ancient town-wall built of uncemented slabs of stone and formerly encircling the whole oasis though now existing only in patches. We were soon threading the winding lanes of Jauf through its palm groves, with here and there groups of ruined habitations and decrepit palm groves, to which Faraj pointed proudly as the result of the operations leading up to the Sha'lan occupation of the district in 1906. A few steps brought us into the midst of the oasis, and we were soon dismounting before the walls of the splendid old fort of Qasr Marid, in the hamlet below which rooms had been provided for us by Daujan, the slave governor, one of the most attractive personalities I have ever met with in Arab lands. Deeply religious with a tendency towards the Wahhabi tenets, honest in the service of the Sha'lan family, and easy-going with the people committed to his charge, he was extraordinarily outspoken in his criticism of the foolish policy which was rapidly carrying the Sha'lan to their political doom, and he amazed me in two ways: he is one of the very few Arabs of my acquaintance who could not be persuaded to accept a present of cash in return for his hospitality, but on the night preceding our departure for Sakaka he came to me to make inquiries regarding the potency of the arsenical powder which he had previously seen me use for the preservation of birds. How much would be sufficient to kill a man? I answered his question as best I could, but I had to refuse point blank to give him any of the stuff, wondering on whom he would have used it had I been more accommodating.

Our stay at Jauf lasted three days, during which we had sufficient opportunities of seeing all that there was to see, but this locality has been so fully dealt with by previous travellers—Palgrave, the Blunts, Guarmani, Aylmer, and Butler and Shakespear, to name only some of them—that no detailed description need be attempted by me. A few photographs of the oasis and its contents will suffice, and I need only mention the great mediæval (Arab) fortress of Qasr Marid built on a conmanding eminence with recently constructed mud towers replacing their stone predecessors; the copious well-springs, which provide slender running streams for the irrigation of the oasis; the ruins of the central hamlets of Suq and Suq al Hattab, which would seem to be of the same period as Marid itself, the houses being built of uncemented stone slabs; and the species of red marble abundant in the neighbourhood, out of which they make



QASR MARID, JAUF AL AMIR

QASR MARID, JAUF, FROM NEIGHBOURING HAMLET

STREET AND MOSQUE IN JAUF AL AMIR

SAFAITIC INSCRIPTIONS AT HARRAT

coffee-mortars. There is no town properly so called, but a population of about 5000 souls is distributed over some dozen hamlets. The old fort at the eastern end of the oasis, built and inhabited by the Rashid's governors, exists only in its tumbled ruins, and the general aspect of the whole place is one of decay.

On our arrival at Jauf we received an invitation from Sultan to visit him at Sakaka, and thought that our troubles and difficulties were over, but Faraj had still to be reckoned with. Throughout the journey he had not scrupled to beg of us and to encourage his small following to do the same—without success; but now he began to press his suit more vigorously. We were anxious to visit Sakaka, and, knowing that we should not be allowed to return home by way of the Sirhan depression owing to dangers real or imaginary, had begun to consider the alternative of returning viâ 'Iraq—a roundabout route which appeared to have the double advantage of being safer and enabling Major Holt to complete his railway reconnaissance. Faraj held out hopes of assisting us in this project for a consideration and, to cut a long story short, he asked me point blank what I would give him. I replied point blank, "£100 on arrival at Najaf or Karbala." He held out for more and I refused Daujan however insisted on our being allowed to visit Sultan at Sakaka, and on the morning of May 23 we set out under the most unfavourable auspices, Faraj and his companions following rather than accompanying us breathing out threats of vengeance. "Go on to Baghdad," he hissed, "alone and at your peril, but whoso goes without my permission I will set all the Ruwalla on to him; I am commissioned by Mujhim to let you see Jauf and to bring you straight back, so you shall have a day at Sakaka and back you will come, the whole lot of you, with me." His venomous attitude could be met only with bluff. I chid him with the Sha'lan's scurvy treatment of their guests and declared that we should be relieved to place ourselves in the hands of Sultan from the moment of our reaching Sakaka, when we should no longer require Faraj's services.

Our march lay along the flank of a sandstone ridge with billows of sand to our right until we reached the oasis of Qara, after passing through a tract of heavily weathered and blackened sandstone rocks. Qara is a long oasis lying in a mud flat, over which we marched well away from the settlement, of whose temper we were doubtful. When we were almost past it we were startled by a rifle-shot across us, but, having no cover of any kind, pushed on. The shot was not repeated, and we duly reached the billowy sand-dunes lying between Qara and Sakaka. Our normal route would have been along the flat to the small oasis of Tuwair and thence to the western extremity of Sakaka, but the rebel holdings lay in this part of the oasis, and we preferred to steer straight for the eastern end across the sand hills.

Beyond the sand strip we emerged on to a great flat plain, having

the whole length of the oasis in view before us, and as we advanced we became aware of a party of horsemen galloping towards us. The order was given to load rifles, and we advanced until the horsemen, reaching us, curveted round and through our ranks, firing a salute of welcome, to which our party replied in the same fashion. In half an hour we entered the eastern extremity of Sakaka and couched our camels before the door of an ordinary dwelling-house, in which Sultan and his immediate following had taken up their residence for the siege of the rebels, the fortress at the end of the oasis being held by a garrison of slaves.

Entering the coffee parlour we made the acquaintance of Sultan, a mere boy of perhaps fourteen years, good looking though of somewhat effeminate type, but obviously accustomed to his rôle of governor and commander-in-chief. He and his cousin, Bandar, both impressed us much more favourably than had done any of the other members of the Sha'lan family we had already met, but the conduct of the siege was a piteous farce. The besieged numbered some seventy-five souls all told, while the total population of Sakaka must have been close on eight thousand, but Sultan could only count fully on his small garrison of slaves in the fort and a few mercenaries, while the rest of the population was a source of constant anxiety and would have changed their nominal loyalty for active rebellion at the slightest indication of help coming to the rebels from Ibn Sa'ud. Pending the receipt of definite news from Nejd, however, they maintained a semblance of loyalty and enthusiasm, in return for which Sultan, playing with fire, issued to them rifles and ammunition, which might at any moment be turned on himself. It was still Ramdhan, and by a sort of tacit understanding all active warfare was confined to the night period, when friend and foe could not see each other. Casualties did occur in spite of this, though very occasionally, perhaps two or three in all during the whole of our sojourn—all among the besieged. On each such occasion the loyalist army of some 200 or 300 men would parade in front of Sultan's dwelling to cheer him up with a war dance to the martial strains of several drums. Round and round the dancers footed it, brandishing loaded rifles, revolvers, swords and what not, firing as they went without thought of direction or economy. Many a day and night of our visit was made hideous by these exhibitions, at which the banners of Sakaka and the Wahhabis were paraded with delightful impartiality, and we were expected to attend them and enjoy the din. They would have been amusing enough had blank ammunition been used, but the indiscriminate firing of ball ammunition often at a distance of a few feet from the spectators made these spectacles positively dangerous, and it is a marvel to me that no accidents ever occurred.

We had seen and had enough of Sakaka after a day or two, but Faraj was an obstacle to progress eastward towards Mesopotamia, on which we had now decided to insist at all costs. Sultan was willing enough to accommodate us, but Faraj told him that Nuri had expressly forbidden

such a venture, and Sultan was not strong enough to take matters into his own hands. On the third night of our stay a compromise was arrived at, namely to refer the matter for the orders of Nuri himself, then camped at a distance of at least six days' journey. Faraj however undertook to carry the message himself and be back in eight days, till when we should wait on the understanding that we should be free to start without further ado should Faraj not return with Nuri's reply by then.

We had to content ourselves with this arrangement, and, right glad to be rid of Faraj, made the most of our opportunities of seeing the oasis and its immediate surroundings, hoping all the time that Ibn Sa'ud's reinforcements for the rebels would not arrive before our time was up, as we were convinced—correctly as it turned out—that Faraj could not return in time and probably had no intention of doing so.

Sakaka, like Jauf, has no town but consists of a considerable area of palm groves dotted here and there with pretty hamlets, each peopled by one of the many units which compose the population of some eight thousand souls. It has practically supplanted Jauf as the political and commercial capital of the Juba district, and it appears to be in frequent trade communication with Mesopotamia, whence it draws the bulk of its supplies of foreign commodities—piece-goods, rice, coffee, tea, and sugar being the chief articles of import. The oasis is picturesquely situated within a semicircle of fantastic sandstone hills, on one of which, close to the oasis and detached from the main range, stands the old castle of Za'bal, reminding one of the mediæval fortresses perched on eminences along the Rhine. We were however unable to visit the castle or approach near to it, as its inhabitants were suspected of doubtful loyalty, and on one occasion, while we were wandering about on a ridge commanded by the fort, a couple of rifle-shots warned us not to tempt Providence too long.

Our enforced sojourn at Sakaka lasted from May 23 till June 2, and the loyalist exchequer soon displayed its inability to maintain us in a manner suitable to guests of honour. For two or three days we were entertained in a normal manner. Then several meals in succession consisted of no more than a dish of plain rice. On the third or fourth occasion I refused to dine. This produced some commotion, and late that night a goat was brought in bleating to our quarters and a portion of it served at a late hour. The season was approaching midsummer, but that goat lasted us five days, and, as luck would have it, Daujan, having come to Sakaka on a visit from Jauf, sat at meat with us on the fifth day. Unsuspecting, he complained of the absence of gravy, and it was whispered to him that the gravy had not been served as it was a bit smelly. "You will find," I said aloud, "that the meat stinks too—we killed this animal five days ago." He was genuinely horrified and expressed his opinion of the matter to Sultan, but we were due to leave Sakaka the next day and cared for nothing.

One last difficulty had to be surmounted. Haditha and Mithqal had long ago deserted us with their followings at Kaf, and now the bulk of our reduced party, fully primed with tales of the danger of the way to 'Iraq, showed signs of not wanting to go further. Ghalib Pasha, our gallant general, went in such daily terror of the arrival of the Wahhabis that he actually took lessons in the way to pray and spent all his time reading the 'Traditions of the Prophet,' the Quran, etc.; naturally enough he led the revolt against the idea of going to 'Iraq, and I summoned a full meeting of our company to separate the goats from the sheep. The goats should not of course participate in any distribution of bounty, but of the twenty-one persons forming our party nine, including all the leaders, proved to be goats, and we decided to carry on with the remaining twelve, reinforced with four mercenaries recruited from Sakaka and subsequently by five Sulubi hunters, whom we recruited at our first night's camp at the wells of Suwair at the eastern extremity of the Juba depression.

We were now by our line of march about 308 miles from Amman and 203 miles from Kaf, while it was approximately 300 miles from here to Karbala by the route we followed when we left our hosts, without regret, on the afternoon of June 2. The march of 13 miles to the Suwair wells was uneventful mainly over Nafud sand-billows, and that night we camped at a considerable encampment of Suluba. We were now at the edge of the Juba depression, but the steep cliff of the Suwair ridge, which skirts it, offered no suitable path for our camels, and next day, our start being delayed by our new Sulubi recruits going off in search of their camels, we had to follow the cliff northward for about 8 miles to a moderately easy passage out of the depression on to the limestone desert beyond.

The remainder of that afternoon, the whole of the next day when we did a forced march of about 45 miles, and a short early morning march the following day, a total distance of about 55 miles, brought us again to water in a muddy pool called Ghadir Turaifawi, surviving from past rains and teeming with wriggling creatures resembling shrimps. However we were too thirsty to mind that. Another 12 miles brought us at midday to the wells of Abal Dufuf in the trough of the broad shallow depression of Wadi 'Ar'ar, which we had now been following for the best part of 60 miles from its watershed in the uplands east of the Juba depression. The whole march had been uneventful, we had seen no human being, gazelles had been seen in thousands, and our Suluba had procured some for our larder. The Abal Dufuf water was plentiful and good after that of Turaifawi.

From here the 'Ar'ar depression makes a wide sweep to the northward, and we cut straight across the uplands to the south, camping therein for the night in Sha'ib Ruthiya after a march of 14 miles and re-entering the 'Ar'ar 6 miles further on on the morning of June 6. The 'Ar'ar had

MINWA FROM THE SOUTH

SAKAKA, WITH FORT ZABAL IN DISTANCE

APPROACHING SUWAIR OVER THE EDGE OF THE NAFUD

NORTH DOOR OF UKHAIDIR FROM WITHIN

AMMAN FROM SOUTH-EAST OF THE AMPHITHEATRE

now developed a well-marked storm channel meandering from side to side of the depression in a deep sandy bed exhibiting a rich green vegetation. We hoped to find water in the water-holes of Qata'iya 9 miles down from this point, but on arrival there found that the last flood had filled in all the holes with sand, and hastened on to make the well-known watering of Judaidat al 'Ar'ar by midday. As we marched we spotted the very fresh tracks of some camels which had recently passed in the same direction. Our water-supply was so low that it was imperative to get to the wells, but we marched cautiously lest an enemy might already be in occupation.

Our scouts were out well ahead as we marched over the dreary wilderness of the 'Ar'ar between its low barren flanks, beyond which we could not see. After some 4 miles of this our scouts checked and we hastened to join them behind a low eminence, from whose summit they were watching the movements of our predecessors at the watering. All that could be seen through the glasses was a group of three camels and two men, the latter moving about fetching water. We could not tell whether a larger party was concealed in the torrent-bed, and everybody volunteered a different opinion of what should be done. The " enemy," all unconscious of our near presence, were soon observed to settle down apparently for a long siesta, and we decided to send a small party to take them in the rear and drive them up the valley, while the rest of us remained where we were in ambush. Four of the best camels were selected and four volunteers started off through the uplands, while we waited breathlessly to see them reappear behind the quarry. In fact they misjudged the distance, and it was from a point abreast of instead of behind the wells that they appeared, charging down the hillside. The enemy (two men only) were up in a trice and off on their camels like a flash—a very pretty sight it was—pursued by our four men; but our camels were thirsty, and three of them sat down suddenly on reaching the wells. Nothing could make them budge, so only one of our four men was left to continue the pursuit up the left bank of the depression and out of sight.

We hastened to the wells and found the booty left by the fugitives—two camels obviously stolen by them in the Ruwalla country, a waterskin, a metal bowl, a bag of butter, a bag of rice, and a bag of salt. This last was diagnosed as coming from the salt-pans of Hazil, where the Wahhabis were known to have a camp, so there is little doubt that the two men were of that persuasion. They made good their escape, and it would be interesting to know if they ever succeeded in reaching their camp, which was not less than 100 miles distant, without water, for we had their skin and they could have had no means of carrying any water, while there are no wells between this point and Hazil.

By our track we had now followed the 'Ar'ar depression for well over 100 miles, and here we finally left it to strike north-north-east over a

dreary upland wilderness, ever growing hotter as we descended towards the confines of 'Iraq. A march of about 14 miles that afternoon and on the morning of June 7 brought us to water at the scanty wells of Judaidat al Hamir in Sha'ib Hamir, a depression trending north-east or east-north-east parallel to the 'Ar'ar. Here we saw a large wolf slink away on our flank, and hence we struck out over a vast featureless waste, camping for the night about 30 miles further on. Throughout our progress from Kaf to Jauf and onwards from Sakaka to Karbala we moved in constant anxiety of meeting possible enemies, with the result that we never dared to have a camp fire or lamp by night, while during the hot hours of the usual midday siesta we had no tent and had to make shift with a small carpet, which we extended over our heads on rifles set on end. It was a comfortless and harassing journey, but, apart from the slight adventures I have referred to, we encountered no human beings throughout our course, and it was not till we reached the confines of the Karbala tract that we again saw signs of human life.

A march of 17 miles during the morning of June 8 brought us to the line of Sha'ib Ubaiyidh, which, rising in the watershed 100 miles or more behind us, flows on from here past the mediæval Arab castle of Ukhaidhar on the borders of Mesopotamia into the great lake of Abu Dibis. In its bed near our point of entry we reached water at the numerous wells of Nukhaib, where, in spite of the great heat, I had a pleasant half-hour's shooting of sand-grouse, which wheeled about the water regardless of all danger, so utterly exhausted they seemed to be. The great herds of gazelle we passed during the afternoon seemed to be similarly affected, and our hunters brought down a number of them, while one animal stood stock still at a distance of 300 yards while one of our Arabs had ten shots at him, at the end of which exhibition of bad shooting he trotted off quietly with a snort of disgust.

We did not follow the winding line of Sha'ib Ubaiyidh, but struck across into a hilly tract called 'Aiyarat, in which we camped about 13 miles distant from the Nukhaib wells. Next day we marched over 40 miles across country of the same general monotony as before, though abounding with gazelle and nesting sand-grouse, to camp on high ground, while a march of 26 miles brought us at midday on June 10 to the magnificent ruins of Ukhaidhar, one of the finest specimens of Arab hunting-palaces in existence, on the banks of Sha'ib Ubaiyidh, where there is abundant water.

We camped that night some 9 miles further on towards Abu Dibis and the following morning we were gladdened by the sight of the minarets and domes of the martyred Husain, son of the founder of the Shia' faction of Islam. The Arab governor of Karbala, to whom we had sent on word of our coming, sent out an escort to welcome us and entertained us most hospitably. Our journey thus accomplished, we proceeded to Ramadi, whence on June 17 Major Holt and I returned to Amman

by air, leaving the companions of our travel to return straight across the desert by camel.

Early in July, as I have already indicated, Ibn Sa'ud took possession of Jauf, and our friends the Sha'lan left it, I hope for ever. Mujhim, Farhan, Faraj, and Daujan shortly afterwards honoured us with a long sojourn at Amman, where they were at any rate treated more hospitably than they had treated us, though they were but homeless fugitives, while Nuri and Sultan repaired to Syria, where the Ruwalla will now probably take up their quarters permanently. The occupation of Jauf by the Wahhabis caused much excitement in Trans-Jordan, which believed itself to be directly threatened, and for a couple of weeks the Bani Sakhr lined the heights of Muwaqqar with their weather eye wide open for the storm from the east. But it came not, and by the beginning of August the countryside had again settled down to its customary calm and carelessness. At dawn on August 15 the blow fell as a bolt from the blue. The little villge of Tunaib, situated to the west of the railway line and only 12 miles from Amman, was attacked unawares and its inhabitants, man, woman, and child, butchered in their sleep—some thirty-five or forty victims in all. A chance aeroplane passing over the scene frightened the Wahhabi invaders, who were now attacked by the Bani Sakhr and fled pell mell. For many miles towards Kharana the line of their retreat was littered with the corpses of men, horses, and camels, and it is almost certain that the majority of those daring Wahhabis, who had travelled 1000 miles from the neighbourhood of Shaqra, lost their way in the desert and perished of thirst and exhaustion. A watchful look-out was now kept for a repetition of the attack, and I had an opportunity of accompanying several aerial reconnaissances down Wadi Sirhan to Kaf and beyond, while in September 'Abdullah's forces, assisted by the armoured cars, occupied Kaf. What the future has in store for us on the borders of Trans-Jordan remains to be seen, but Ibn Sa'ud is not likely to slacken his grip on Jauf or abandon his claim to Wadi Sirhan and the Quraiyat settlements.

THE FUTURE OF THE NORTH ARABIAN DESERT

Major A. L. Holt, M.B.E., M.C.

Read with the preceding paper at the Meeting of the Society, 12 February 1923. Map follows page 320.

I BELIEVE the future of the North Arabian desert lies in its value as a potential line of communication. The future of any country is to be found in its latent possibilities, and before showing you the desert's importance as a trade route, I propose to refer to the causes which contribute to any country's importance. These are, firstly its

geographical position strategically and commercially, secondly its inhabitants and neighbouring races, thirdly its natural products.

Geographically the North Arabian and Syrian deserts together form a large triangular area, with Aleppo as the apex, the Euphrates Valley and Persian Gulf as the eastern side, and the base extending roughly from the Persian Gulf along the southern edge of the great Nafud to the head of the Gulf of Akaba ; the western side of the triangle stretches from the Gulf of Akaba northwards past Ma'an to Aleppo, skirting Amman and Damascus. The area is some 260,000 square miles.

The most important neighbour of the desert from very early times has been the plain of the Euphrates and Tigris valleys known as Mesopotamia. This was the granary of the world, and owed its prosperity to its natural water supply and to the wonderful irrigation works of the ancient civilizations. One has but to remember the ancient cities of Hit, Nineveh, Babylon, Eresh and Ur of the Chaldees, and later Baghdad, to realize the importance and influence of this country bordering on the desert. Other important towns of later Mesopotamia on the edge of the desert—Hit, Ramadi, Falluja, Karbala, Najaf, Samawa, Nasiriya, Basra, and Koweit—have come into prominence since the Moslem invasion. Of these latter comparatively modern towns, mostly dating back some 1400 years, Hit, Karbala, Najaf, and Koweit are points of departure for caravans entering the desert.

These towns communicated with the civilization and desert towns of the west. Some idea of their past importance may be gathered from the ruins of such places as Petra and Amman, and from the glories of the still thriving cities of Damascus and Aleppo. Here again the traveller is faced with the sudden contrast between areas rich in water, beautiful with shading poplar trees, palms, fruits and flowers of all descriptions, and the barren lava-strewn country where the only vegetation is camel-thorn, or great open areas of flint-covered plain where at times one has to travel as much as 200 miles without the possibility of finding a reliable watering-place : and 45 miles is a good day's journey for a riding-camel.

Strategically a no man's land, the desert was a great barrier between Syria and Egypt and the fruitful plains of Mesopotamia, an almost impassable obstacle for the armies of both countries, which was crossed by only a few of the world's greatest generals, such as Alexander.

Yet from time immemorial until 400 years ago the desert was the trade route between the Eastern and Western civilizations. Across this barren tract caravans passed bearing the treasures and produce of the East to the cities of the Cæsars. After the decline of the Roman Empire the courts of the Middle Ages depended on the desert route for their Eastern luxuries, their rich silks, precious stones, and spices which came from Persia and India to Baghdad and were then taken across the desert to Damascus, the gateway and clearing-house of the West.

In the days of the Caliphs and in the reign of the great Harun er Rashid, so important was this trade that Zobeidah established a reputation for piety and thoughtfulness by building a line of forts and reservoirs along the Damascus route, or Darb Zobeidah, which was the shortest way between Baghdad and Damascus. The remains of these buildings, known as "Qasrs," are to be found at Qasr al Khubbaz, Qasr Amij, Qasr Muhaiwir, and elsewhere. These forts afforded protection to pilgrims and merchants from the wandering tribes who were always ready to prey upon caravans. These were the days of Sinbad the Sailor, when the sea voyages from India to Basra and the Red Sea were fraught with dangers from pirates; and hundreds of thousands of pilgrims and merchants have blessed Zobeidah for securing the land route, so that string after string of camels could pass on their arduous journey unmolested. Such, then, was the importance of the desert in its geographical position, strategically and commercially.

All this was in the days before Vasco da Gama rounded the Cape in 1497 and opened up a new route to India and the East. With the coming of the great sailor adventurers and ocean-going ships, the desert route was doomed, for it could no longer compete with the sea traffic, and with the vanishing of the desert trade there disappeared the importance of Venice and Genoa which had so long been the European ports for the trade of the Levant and Further East. At the same time Baghdad, which had for centuries been the centre of commerce for the west-bound trade over the desert, lost its glory and importance and sank to the level of a comparatively insignificant city.

We have now to consider the physical conditions of the desert and who were its inhabitants. I believe that at one time there was far more rainfall in the desert than there is now; not that the desert was ever a fertile area, but that in the remote past the climate was less difficult than it is to-day, and that the ancient desert-dwellers had some sort of settlements in places. That this is so is absolutely proved at Al Jidd, where there are evidences of human activity. At this place, over an area of some acres, there are remains of habitations and perhaps places of worship. In some of these stones weighing over two tons have been carried considerable distances and used for building. There are also several old water-holes here, many of which exceed 100 feet in depth, and two have been cut 160 feet through limestone. Close by there is also a burial-ground of considerable antiquity. Al Jidd is close to the Royal Air Force landing ground No. XI., and is 200 air miles west of Ramadi on the Euphrates. Again, in the Harrat there are frequent systematic arrangements of great lava and basalt blocks generally in the form of strong points, with long walls that lead to smaller fortifications radiating out from the principal central fort or enclosure. It has been suggested that these ancient homes are merely coincidental works of nature, but in my opinion and that of the very few others who have

been there, there is not the slightest doubt that they are the work of human agency. The only way to get an effective idea of and record the extent and wonder of these works is to fly over the country taking aerial photographs.

The part of the Syrian Arabian desert with which I am dealing is a huge gently rising plain culminating in the Jabal Anaiza at an elevation of some 3300 feet. This hill rises about 100 feet above the plain, and there do not appear to be any certain records of its having been visited by Europeans before 1921 when, in the company of Captain Carver and Flying Officer Wynne, I visited it while laying out the eastern zone of the Royal Air Force Baghdad–Cairo mail route. From the Jabal Anaiza the bulk of the drainage is to the Euphrates by such depressions as the Wadi Hauran, the Wadyan, and the 'Ar'ar. The fall in all directions is quite gentle, some 20 feet to the mile, so that one has no feeling of being in a mountainous region. The desert is not, however, a great flat plain ; its huge areas are cut up by occasional wadis, like the Hauran which runs from the summit of the Jabal for some 300 miles to the Euphrates, and is in places 200 feet deep and a mile wide : like the Wadi 'Amij, which joins the Hauran and is a depression in a dissected limestone plateau. Then there is that great feature the Wadi Sirhan, some 300 miles in length without an outlet, which appears on the maps coloured in green, leading one to suppose it a beautiful fertile plain, whereas it can be described only as a trifle less waterless than the rest of the desert.

The Arabian desert is not a huge sandy area. But in the Harrat there are frequent areas of up to 40 square miles in which the blown sand has remained among the great lava and basalt blocks, and again in the Wadi Sirhan similar sand is to be found. Its most formidable appearance is in the Nafud, that terrible sand barrier north of the Shammar country. This area, with its continuous sand-dunes sometimes as high as 300 feet, is the terror of all desert travellers, over 20,000 square miles in area, and its shortest distance across is as far as from London to Birmingham.

One of the great physical features is the Harrat or volcanic area which extends southwards from lat. 34° to 31° N., and has a maximum width of about 70 miles. This vast area of some 3500 square miles is almost entirely overlain with lava and great basalt blocks, and is frequently dotted with extinct volcanic cones.

But the greater part of the desert is of limestone formation with frequent Cretaceous limestone outcrops, and the surface has generally a shallow soft dusty layer mostly overlain with black, blunt, flat flints or smooth gravel. Geologically it is monotonous, though the sinter cones near the Royal Air Force landing ground No. VII., some 150 miles west of Ramadi, suggesting extinct geysers, are of unexpected and peculiar interest. No one has hitherto suspected the existence of geyser-like

remains in the desert. Another feature which I first visited when working on the Royal Air Force route is that singular depression near landing ground J some 240 miles west of Ramadi, known as Mukhaimum al Walaj (the hiding-place of the Wadi Walaj), which, at an elevation of some 3200 feet and almost on the summit of the desert, is nearly $1\frac{3}{4}$ miles in diameter and 130 feet deep. Seen from the air it looks like a huge volcanic crater.

And now we come to the oases, which are only four in number. There are of course occasional watering-places on which travellers in the desert depend, and which are as vitally important to the Badawin when grazing their flocks as when raiding their neighbours. Of these the most reliable are the wells with springs giving a constant supply of water, such as Ain Zazu, Muhaiwir, Rutba, Al Mat, Al Jidd, Ma'asir, Baidha, 'Amari, Nabk abu Qasr, Judaidat al 'Ar'ar, Nukhaib, and many more. Others are merely uncertain rainpools which the traveller may or may not be lucky enough to find. But the oases in this huge area of one quarter of a million square miles are four in number. At Palmyra there are a few mud hovels amid the glorious ruins of ancient Tadmor. At the northern end of the Wadi Sirhan is Azraq, with its beautiful blue pools and an old hunting-box long ago abandoned. Forty-five miles further down the Wadi Sirhan is the oasis of Kaf, with the adjacent villages of Ithra, Qarqar, Minwa, Washwash, and Al Ghatti, with a total population of some 2500 souls. And then for 200 miles there is not a sign of human habitation until the Jauf depression is reached.

The Juba, or Jauf depression, is a triangular-shaped area some 200 feet below the plain, and is the biggest oasis in that part of the desert. It extends for some 35 miles east and west and is perhaps 14 miles wide at its eastern end, of which the northern corner forms the apex of the triangle. Like the Wadi Amij the Juba is a dissected plateau, but unlike the former, which is in limestone, the Juba is in sandstone. In this depression there are the two considerable towns of Jauf and Sakaka, and several smaller villages, with a total population of perhaps 15,000 people. Mr. Philby and I were the first Europeans to be in Jauf al Amir since the late Captain Shakespeare, who, soon after his visit, was killed in the desert further east in 1915. At the western end of the Juba is Jauf al Amir, with four hamlets near by, and some 25 miles to the east is Sakaka, with several villages around it. Between the two towns is an undulating, terraced sandstone plain, barren and unproductive.

There are 20,000 settled dwellers living in the oases I have mentioned, a very small population for so great an area. Then in addition there are perhaps about 150,000 Badawin who in the winter and spring, when the rains have watered the desert, graze their flocks on the scanty grass and thorn which have sprung up. During the summer, when the sun has dried up the last blade of grass, these Badawin leave the desert for the Euphrates valley or the grass lands of the Jordan basin, so that in all

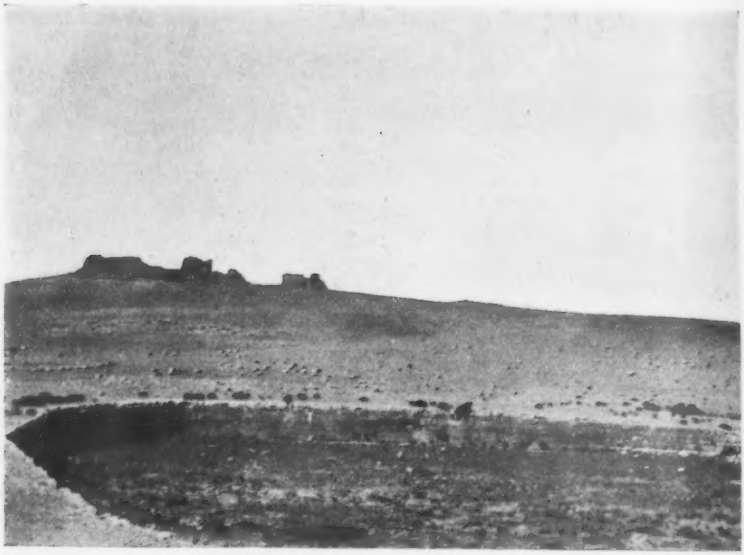
this desert there is not a quarter of a million of inhabitants, or less than one human being per square mile—and of these the vast majority depend for their supplies not on the desert but on the neighbouring countries.

The only exception to this is that singular tribe the Sulubi, which, unlike the Badawin, remain in the desert the whole year round. I have had much to do with these interesting people, and have been frequently entertained by them. They are unique in that they are free from all Badawin raids and live a life of security in a troublesome country. Their origin is wrapped in mystery but interesting. The Sulubi often says he is related to the English; and the word *Sulib* means a cross, hence some traditions connect the tribe with the Crusaders, of whom they are said to be the descendants. I was much amused one day when my friend and guide Faraj (also a favourite guide of the late Colonel Leachman) told me he would like to go to London, for it was the home of the English and so there must be Sulubi there. Certain it is that they are not Arabs in the ordinary sense of the word; their relations with the Badawin are peaceful, but the Badawin despise them and will not intermarry with them. In morals they appear to be unusually lax. Still further unlike the Badawin are they in that they are workers of a sort: tinsmiths, quack doctors, great hunters, and good shots, whereas the Badawin despise any other work than the herding of their flock and sporting raids on an unguarded enemy far inferior to themselves in number. Faraj told me another interesting story about his tribe. When in the far past Allah divided the great desert world among the sheikhs the Sulubi leader was absent asleep, and so he got nothing. When he awakened and heard the news he went to Allah weeping bitterly over his loss and begging for a share of the World. Allah told him that, as the Earth was already parcelled out, the Sulubi could get no share, but as a consolation it would be their lot to roam the world in peace and free from molestation. It is a singular fact that in all Arabian history the Sulubi tribe is the only one free from raids, and all other desert peoples respect this freedom.

We must now consider the products of the desert and try to attach a commercial importance to them. Even the oases are not quite self-supporting, for wheat and rice are not grown in sufficient quantities to meet the demands of the settled inhabitants. Barley and vegetables, fruit such as peaches, plums, apricots, and dates, are grown; but all such foodstuffs as tea, coffee, and sugar are imported. The Badawin draw upon the Mesopotamian, Trans-Jordan, and Syrian towns for the bulk of their supplies. The only exports of interest are wool, camels' hair, skins, camels' and goats' hair clothing and tents, butter, and large numbers of camels and sheep. Some 3000 to 7000 tons of salt are sent out of Kaf annually. No other mineral wealth is as yet known. Nothing produced from the desert will ever give the country importance or commercial interest.

QASR AZRAQ FROM THE SOUTH

QASR AL KHUBBAZ AND RESERVOIR



RESERVOIR AT QASR HALLABAT

RUINS AT AL JIDD

And yet the desert has a great future. As in the past the desert was the only line of communication between Europe and the East, in which capacity its importance was immeasurable, so again it is as a line of communication solely that it can look to the possibility of a future. If it has been in disuse as a trade route for four centuries, why should it once again come into prominence and appear as an urgent and necessary line of communication? Much the same question as this was asked when it was proposed to cut through another desert and build the Suez Canal. A few reasons for the re-opening of the desert trade route are the renewed importance of Mesopotamia with the disappearance of Turkish Administration, and its agricultural possibilities; the collapse of the Russian railways, Trans-Siberian and Persian; the Western desire to speed up communications; and the impetus given to air services during the Great War and their post-Armistice development.

As a result of the Great War and its consequent political effects, there has arisen a change in the importance of the Middle East, owing to the entire change in the political administration of Mesopotamia.

That the Turks realized their abuse of, and lack of interest in, the development of the great potential granary in their charge was evident from the work at the Hindiya barrage on the Euphrates which they commissioned Sir John Jackson, the British contractor and engineer, to carry out. They had also already begun the construction of the great Habbaniya escape, below Ramadi, which was to store up the wasted flood waters of the Euphrates. With the coming of the War all work on these great irrigation projects ceased. But though nothing very extensive has been done in the development of agricultural interests for so many years in this old historic granary, there are great possibilities. In addition to being a granary, Mesopotamia may develop into a great cotton-growing country, for experiments have shown that cotton can be grown there equal to any that the world can produce, not only in length but in fineness of staple.

The collapse of the Russian railways has had a very serious effect on Persian commerce. In the old days of the caravan trade Persia was one of the principal contributors to the trans-desert traffic. Not only Persian, but much Indian produce which had come all the way through the frontier passes was forwarded to Baghdad. With the coming of the Russian railways much of the Persian trade went north and reached Europe through Russia. For the time being, however, Russia has ceased to influence that trade. When Persia is re-opened traders will naturally seek the quickest outlet for their goods to Europe. This outlet is to be found in the trans-desert route, and it is quite certain that the opening of a direct railway line from the Mediterranean Sea to Baghdad will be followed by its early extension to Persia.

Trade insists on rapid methods of transport and is always seeking to shorten and speed up its routes. By steamer service from Baghdad

to London mails take anything from twenty-seven to thirty-one days, but by the trans-desert air route a letter has been delivered in London less than six days after leaving Baghdad. So great is the interest in this service that the promoters of civil aviation are preparing not only to work the Baghdad air mail commercially, but to extend the service to India, and when this is done passengers and mail will be delivered from London to India in less than seven days. Great as is the future of aviation, it is difficult to foresee the day when flying machines will be able to carry heavy loads great distances at a price which can compete with ground transport. Thus the present growing demand for a shorter route from Persia and Baghdad to the Mediterranean can only be met by a railway across the desert.

The construction of the trans-desert railway has been proved feasible. The expedition to Jauf has taught us where not to go if nothing else. From an engineering point of view the railway has few difficulties, and financially it is considered that it will pay its way. The journey from Port Said to Basra is some 4500 miles by sea and an additional 360 miles to Baghdad by rail, or far more by river. The desert route would be only 680 miles by train from Haifa to Baghdad. I would many times rather cross the desert by that most arduous means of transport, the camel, than do the sea journey, and by train it would be infinitely preferable. By train you would pass down the Jordan valley, and rising up to the plain, travel along the plateau at a height of 2000 to 3000 feet for some 300 miles, and then descend gently to the Euphrates. From London to Baghdad by sea is a journey of about twenty-seven days, whereas from London to Haifa by sea is a journey of about twelve days, and, with two more thence to Baghdad by rail over the desert, would make a saving of nearly two weeks to Iraq and Persia.

In connection with this possible railway I came to wander extensively in the desert. Active reconnaissance commenced early in 1920. Major Burton, a well-known railway surveyor, accompanied by Major Yetts, Political Officer of the Dulaim district of 'Iraq, and Captain Thomas of the Levies, set out from Hit on camels and got as far as Muhaiwir on the Damascus route, where one night they were raided and narrowly escaped death. Captain Thomas was seriously wounded by a dagger thrust in one lung and Major Burton escaped with slight injuries. It was after this that I began a series of reconnaissances in Ford cars, the last occasion being in company of the late Colonel Leachman, when we got almost as far as the Jabal Anaiza. The insurrection of 1920 in Mesopotamia put a stop to all such work in the desert for many months. But in 1921, at the Cairo Conference, it was decided by His Majesty's Government that the Cairo–Baghdad Air Route should be established, and while in charge of the laying out of the ground on the eastern zone of the route, I was able to gather much information concerning the feasibility of building a railway across the desert. Again in the summer

of 1922, when considering an alternative alignment *viâ* the Jauf Oasis instead of the more direct route through Hit, I accompanied Mr. Philby on his political mission to Jauf. On my return to Amman in July I went out once more riding on a camel across the Harrat to Burqa and returned over the same tracks, having spent ten days in that terrible bare lava-strewn country in mid-summer.

Having regard to Mr. Philby's comments on motor transport for desert reconnaissance, some remarks on travelling in the desert will not be out of place. I have travelled some 14,000 miles in the desert in Ford cars, and crossed by this means between Baghdad and Amman on three occasions. I began these motor reconnaissances in May 1920. On one occasion, with Colonel Leachman as the only other European, I made a journey with four Fords to Al Mat up the Wadi 'Abaili nearly to the Jabal Anaiza. Having covered 506 miles of trackless ground, we returned to Hit with sufficient petrol and water to take us another 90 miles.

It is true that for successful motor reconnaissance very careful organization is required, and special fittings are necessary. A new condenser was designed for our expeditions, and it proved so efficient that our average daily consumption of water was less than one and a half pints per Ford in the hottest of weather. As with camel transport one never travels without Badawin who have a thorough knowledge of their animals, so one cannot take out cars without drivers who have an intimate acquaint ance with the mechanism of their vehicles. And while it is true that camels can be taken where motor cars cannot go, it must be borne in mind that in the hot weather a camel cannot travel long journeys for more than two days without a drink, thus limiting his distance between watering-places to 80 miles, or, under extreme necessity, 100 miles, which involves travelling part of the time by night, when reconnaissance work is impossible, whereas I have taken a convoy of Fords 350 miles in the desert without touching water. The extraordinary advantage of this in reconnaissance needs no emphasis. In wet weather there comes a time when the surface is so slippery that camels cannot travel, and this applies to some, if not to the same, extent to cars. But in all my desert travelling with the Fords I have never experienced a mechanical delay of over one and a half hours, and on one occasion I covered more than 170 miles in a single day. During the reconnaissances for the trans-desert railway and during the laying out of the trans-desert air route, our cars exceeded a total of 70,000 car miles and not a single vehicle was ever abandoned. Without motor transport the Baghdad–Cairo air mail route would never have been laid out.

In conclusion, then, the products of the desert are practically speaking nothing, and the inhabitants of no account. The Badawin travels not from love of the wandering so much as from the necessity of finding a livelihood, and the scarcity of agricultural land in Arabia forces him to

depend on his flocks for sustenance. And so he and his fellows must wander to seek grazing-grounds, and a meagre enough living it is. Their ration of solid food is small, and the large quantity of milk and butter which they consume is insufficient to give them the necessary stamina and strength for hard work. If the Badawin could find land they would become agriculturalists. This land is to be found in Iraq; and if with extensive irrigation it were made available, not only would the nomads of the Syrian and North Arabian deserts move to the land, but thousands of others in Central Arabia would migrate to such a promising country.

So long as there is political uncertainty in 'Iraq, so long will the great purpose of the desert be unaccomplished, but once the security of person and property in Mesopotamia is ensured, capital will flow into that country, and then the necessity for the re-opening of the long-dormant line of communication will become evident. As soon as this need is fully realized there will be flung across the barren vastness of the desert a railway which, by linking up the rivers and plains of the east with the sea of the west, will restore to the desert its former importance as one of the world's greatest trade routes.

Before the papers the PRESIDENT (the EARL OF RONALDSHAY) said: Mr. Philby requires no introduction to an audience of the Royal Geographical Society. He has already read two papers before this Society upon his experiences in Arabia since the day when fate transferred him, some seven years ago, from India to Mesopotamia. The journey which he undertook last summer in company with Major Holt took him for some 600 miles across the hungry and inhospitable stretches of North Arabia from the Trans-Jordan to Mesopotamia. About midway stands the Juba depression and, in the Juba depression, the oasis of Jauf. And here our author will, I think, lift the curtain upon a scene of fierce personal jealousies and tribal animosities. It is, indeed, a fair indication of the unstability of the political situation in that part of the world that within little more than a month of the time of their visit to the oasis of Jauf it changed hands, and is now in the possession of the Arab chieftain, Ibn Sa'ud with his Wahhabi followers. As the lecturer, Major Holt, will no doubt make clear to us, from the point of view of travel Arabia at the present time is neither a safe nor a comfortable country. I am told that the travellers never ventured so much as to light a camp fire or even a lantern when they bivouacked at night. And we are also told that every individual met in the desert is an enemy, or a potential enemy, and that the weaker party has to speed well away if he is to avoid death. That is the character of the country through which we are to be conducted this evening.

We regret that Mr. Philby himself is not able to be present. After a short sojourn in England he has returned to his post in Trans-Jordan. But we are fortunate in having with us the companion of Mr. Philby's journey of last summer, Major Holt. Major Holt's particular interest is the question of possible lines of communication in that part of the world, and he will, no doubt, be able to tell us much of the possibilities of that kind which exist. I shall now have great pleasure in calling upon Major Holt to give us a description of the journey which he undertook, in company with Mr. Philby, last summer.

Major Holt then gave an account of the two papers printed above, and a discussion followed.

Colonel LUBBOCK: My only claim to be here is the fact that I was in charge of the railways in Mesopotamia when we first launched Major Holt out on what seemed to me a very perilous and treacherous journey. His predecessor in desert exploration, who, I believe, is in the room to-night, very nearly met his end after having gone out 100 miles into the desert. His camp was looted and one or two of his followers were murdered, and they tried to kill him, but finally left him stranded and destitute in the desert. However, he managed to reach a friendly tribe and so get back to Baghdad. When in the next year we were told to try again, it was with some perturbation that I saw Major Holt start off to the desert. However, since then all has been successful, and beyond the adventures of which he has told you to-night nothing serious has happened. It is really very extraordinary. You may say the motor car—chiefly Henry Ford—and the aeroplane have made desert exploration of this sort possible. They are not the sort of things you would connect with railway reconnaissance through a desert, but if it had not been for the motor car and the aeroplane it would have been an exceedingly difficult thing to accomplish, and it would have taken a very long time to ascertain any feasible route for a railway. As it is, Major Holt has, no doubt, discovered and marked out what is probably a perfectly feasible route for a railway, from an engineering point of view. We cannot all of us share his somewhat optimistic views as to the possibility of the railway eventuating; nevertheless, there is no doubt that from an engineering point of view it is a possibility.

The PRESIDENT: We have another gentleman present whose knowledge of that part of the world might almost be described as unrivalled—Dr. Hogarth.

Dr. HOGARTH: I am sure that my knowledge of this part of the world can be considered unrivalled only because hardly anybody knows anything about it at all. It certainly is very much exceeded now by the knowledge of both Mr. Philby and Major Holt. I have listened with immense interest to what Major Holt has had to say, and with equal interest I have read Mr. Philby's original paper, from which time did not permit Major Holt to give more than an occasional extract.

It is very interesting to learn, first of all, from Major Holt that these schemes for laying a railway across the desert are still very much alive. It was also very interesting to hear from the last speaker that there is considerable doubt about a railway actually being made. It is one thing to take cars across the desert. It is one thing to take aeroplanes. But it is, of course, quite a different thing to lay down a permanent track and face the difficulties of tribal warfare—difficulties which have been experienced on the Hejaz Railway—and the still greater difficulties of political control.

Major Holt, and also Lord Ronaldshay in his opening remarks, referred to the very insecure state of the desert at the present time. It has been going, since about 1918, through a crisis which even in that land of turbulence is considered excessive. For the first time in the memory of man the ordinary laws of desert hospitality do not hold. Neither do the ordinary laws of desert security; that is to say, you are not secure even if you take a tribesman from the tribe you meet; the law of the *rafik* is neglected. I am afraid we are ourselves partly responsible for that, because we supplied so much gold to the Arabs during the last two years of the war, thus giving them enormous purchasing power; and still more because we gave them the opportunity to help themselves to almost unlimited arms in the campaign we made in Palestine—

I dare say also in the Mesopotamia campaign; but certainly in the Palestine campaign. The advance of Allenby was so rapid that it was impossible to prevent the immense amount of arms thrown away, or left stacked, by the Turks from being abstracted. It was said that there was not an Arab within a radius of 200 or 300 miles who did not possess two or three modern rifles and any amount of cartridges. The result has been great insecurity.

I notice in Mr. Philby's paper that the remedy suggested is the extension of Ibn Sa'ud's power over that part of the world. That might be so if the Wahhabi State is capable of expansion. I quite admit that Ibn Sa'ud is the strongest ruler in Arabia and the one with the best idea of establishing security. But no Arab empire has ever lasted very long, and I should be very much surprised if the present rule of Ibn Sa'ud does not shrink enormously on his death, like the Shammar Amirate at the end of the last century.

On geographical and historical grounds Jauf does not naturally belong to any one who lives on the south of the Nafud, neither to the Amirs of Hail or to those of Riyadh. I have no doubt Nuri Sha'lan and his descendants are bad masters from the point of view of settled peoples; but they appear not to be such bad rulers from the point of view of the Badawin. It was, after all, Nuri Sha'lan and his tribe who, during the last week of the Palestine campaign east of the Jordan, captured Deraa and Damascus for us. Certainly Jauf, lying in the Ruwalla country—for the Ruwalla extend into the Nafud—seems to belong more properly to them.

Whether we shall ever make Jauf a railway centre is very doubtful. There has been more than one scheme for so doing. I can remember a good many years ago one for taking a railway straight across the Sinai Peninsula, with Jauf as the midway point and striking straight from there across to Baghdad. Major Holt's alternative scheme appears to be to branch off from the Haifa railway and take the line down Wadi Sirhan to Jauf and thence by the Wadi 'Ar'ar to the Euphrates valley. That is probably a more feasible route than the other. But neither he nor any one can speak with authority on that, because the Wadi Sirhan has not been actually surveyed for a railway.

I am sure you will all have listened, as I have, with the very greatest interest to Major Holt. He has revived a good many names and people of whom we heard a great deal five years ago and of whom we have not heard since. I was particularly delighted to see those admirable photographs of Azraq, the place in which T. E. Lawrence—I suppose we must not call him "Colonel"—lived for a great many months, and which was the actual base of the final operations in the advance of the Arabs up the East Jordan. It was there that Feisul joined his army in 1918, and it was from there that the final advance to Damascus was made.

I can quite realize that if you have been living in the desert for several months the blue pools of Azraq must have an extraordinary charm, though it may be somewhat less in the heat of midsummer, if I remember aright a very vivid description of an experience of the present Under-Secretary for India, Lord Winterton. He bathed in the pools, but the virulent attack made upon him by camel flies caused him, I believe, to flee naked and ashamed, and he never attempted to bathe again in those pools. The paper has been a series of really admirable views and photographs, the excellence of which I can only admire. They are such as I know I could never possibly have taken under the difficult conditions which obtained. Several of them seemed to me among the best photographs I have ever seen taken in that extraordinary country.

The PRESIDENT: My own experience of railway engineers has led me to

the conclusion that they as a sect have always been born with an undue share of optimism, and the paper which we have heard to-night has only confirmed the conclusions which I have drawn from previous experience. Major Holt, I think, is indeed optimistic in his expectations as to the construction of a railway in the part of the world which he has described to-night. Dr. Hogarth has just referred to one of the obstacles in the way of railway construction, namely, the political difficulty, the unstability from a political point of view, and the lawlessness of the people. It occurred to me that that difficulty will before very long solve itself. Mr. Philby holds the view that the introduction of modern rifles into the country has brought about the decimation of the population. If modern rifles continue to be used by the people as they are at present, it seems to me that the logical result will follow and the population will cease to exist, so that in that way possibly the political difficulty which has been referred to by Dr. Hogarth may solve itself. It seems, however, that that would only increase another obstacle in the way of railway construction, which occurred to me as I was looking at the photographs of the country. There would be nobody to travel by the railway.

As far as I can judge from the nature of the country displayed by the photographs there would be an extraordinarily small amount of goods to move. The railway would, indeed, have to rely entirely upon its through traffic. Of course I quite appreciate the importance of rapid through communication between Europe and Asia, and, indeed, in the past I have been an advocate of schemes of railway construction with that end in view. But though I do not wish in any way to discourage Major Holt in his hopes with regard to railway construction across Arabia, I am bound to say I scarcely share the optimism with which he is himself animated. Nevertheless, we are much indebted to him for the description of the country which he has given us this evening and for the excellent series of pictures with which he has illustrated what he has had to tell us. On your behalf I venture to offer to him an expression of your sincere thanks for the entertainment and the instruction with which he has provided us.

A VISIT TO THE IDRISI TERRITORY IN 'ASIR AND YEMEN

Rosita Forbes (Mrs. McGrath)

WHEN Kamel Fahmi and I landed at Jizan, in November 1922, after fourteen days' sail in a dhow from Port Sudan, we were welcomed on behalf of the Emir, who had known of my proposed visit for some time, by his cousin and vice-regent, Sayed es Senussi, and his son, Sayed el Abed. Jizan, which shares with Midi the honour of being the largest port in 'Asir, has a population of about 8000 and a flourishing export trade in coffee and honey, pearls, hides, oil of sesame, grain, and a certain amount of livestock. The houses of the merchants and ashraf are two-storied buildings of coral rock, covered with stucco in some cases decorated with raised designs, while the poorer folk, mostly fishermen, live in round huts made of durra straw and lined with clay, often a couple of feet thick. The raised floor is of clay, with a hearth in which are different-sized holes for the various drinking-vessels,

and sometimes the walls are painted with coloured arabesques and hung with women's work—mats, platters, hats, bowls, and baskets—woven from dyed grass. The furniture consists of rope couches on wooden frames, the seat being made from the twisted leaves of the dom palm, and covered with mats and carpets on the coast, with sheepskins inland.

That portion of 'Asir which is directly under the Idrisi subscribes, at least nominally, to his tarika, which, like the more famous Senussi whose originator was the pupil and follower of the great-grandfather of the present Emir * of 'Asir, condemns all luxury and advocates a life of simplicity, asceticism, and complete withdrawal from all outside influence, coupled with a rigid observance of Koranic law. No strangers, whether Moslem, Christian, or Jew, are allowed in 'Asir, with the result that the people, even in the towns, are narrow-minded and fanatical. There are hardly any educated men in the country, and none of the tribal chiefs that I met could read or write. Sheria law—Shafei—is administered by bigoted Qadis who are generally ignorant of any other form of legislation, and the only court of appeal is the Idrisi, who took the highest degrees of theology and jurisprudence that El Azhar could bestow and is looked upon, not only as the peacemaker of western Arabia, but as one of its most learned men. The only schools in the country are the primitive "katubs," where a sheikh who sometimes believes the world a square board, teaches the Koran, the 'Sayings of the Prophet' and such arithmetic as is necessary for a clear distinction between mine and thine. The day begins and ends with the sun, for only the rich can afford the exorbitant price demanded for imported oil. A curfew drum is beaten three hours after sunset as a warning to all citizens to remain in their houses till dawn.

Law and order are extremely good in the Mikhlaf el Yemen, immediately surrounding the Idrisi headquarters which moves between Sabya and Jizan, but outside this district the traveller, if he be of importance, must have an armed tribal guard. The punishments of the Koran are strictly enforced. The murderer loses his head, the thief his hand or hand and foot, according to the magnitude of his crime, and a couple convicted of infidelity are buried in the sand to their armpits and stoned to death. The brawler is fined 5 reals, and the test of a white-hot iron on the tongue is still applied to the suspected liar. Prayer is said in the open five times a day. Smoking is forbidden. There are no cafés or dancers, and the only troupe of dervishes I saw was further south in Yemen, which has a much laxer standard of life.

There are no shrines in 'Asir, and the various families of religious Sayeds who used to be so powerful during the long struggle between the Turks and the Hussein house of Abu 'Arish have dwindled into insignificance under the puritanical rule of the Idrisi. The territory over

* Since this was written the Emir Idrisi has died, and Sayed Mustafa rules in his place.

THE PORT OF JIZAN

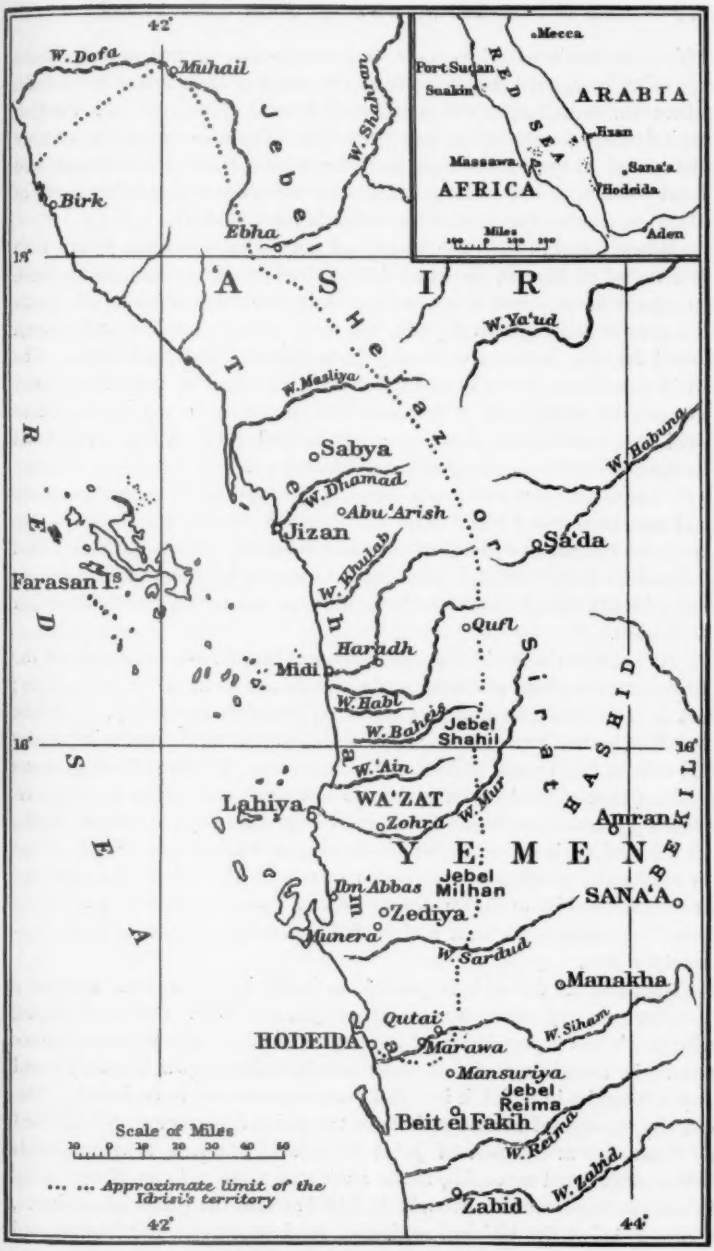
MERCHANTS' HOUSES IN MIDI

A TYPICAL YEMEN VILLAGE

A TOWN ON THE EDGE OF THE FLAT TEHAMA

LAHIYA, A CITY DEAD SINCE THE WAR

WOMEN WATER-SELLERS IN THE LOCAL STRAW HAT



Sketch-map of Yemen and 'Asir.

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which the Emir exercises more or less effective control, a strip some 270 miles long, stretches from a few miles north of Birk, inland to Muhail, where the boundary turns south and, leaving Ebha, the old Turkish capital, some 7 miles to the east, runs level with the coast at an average distance of 50 to 60 miles from it, through Jebel Sirat, Jebel Shahil, and Jebel Milhan, at which last point it turns westward and, passing south of Marawa, reaches the coast a few miles beyond Hodeida.

When I was in 'Asir the Idrisi had concluded a definite treaty with Ibn Sa'ud of Riyadh by which his eastern frontiers were guaranteed. In return for this free access to the 'Asir ports was given to all goods going to or coming from Riyadh, and most of the zakat levy on livestock found its way across the mountain to famine-threatened Nejd. The Idrisi was nominally on good terms with King Hussein, though the latter was secretly subsidizing Mohammed Hassan ibn Aidh and the rebellious Beni Mugheid tribe against him; but at Qufl, Jebel Milhan, and Jebel Reima the Emir was engaged in a mild and not very dangerous warfare with Imam Yehya of Sana, who occupies the high-level mountain country and threatens the Idrisi's flank as far north as Sa'da. However, the powerful Hashid and Bekil tribes which hold the main ridge have allied themselves with the Idrisi, principally to ensure his favourable intervention with Ibn Sa'ud, should the latter attempt another raid in the direction of Yemen.

At present the Idrisi has about 15,000 men in the field against the Imam and the piratical Zaraniq tribe who lie across his southern borders; but it is probable that, in a moment of popular emergency, he might be able to raise 30,000 men. We estimated the total population under his rule as nearly two million, and his revenue, obtained from customs duties (these yielded about £120,000 last year) and tithes as approximately £200,000 sterling. The country is governed by twenty-one Amils, civil functionaries who are nominally responsible for their districts, but in reality the whole power is vested in the Idrisi, and since everything is referred to him at Sabya, the process of government is held up while camel messengers go back and forth between the capital and the provincial towns.

Sabya is, as far as it is possible to judge in a motor-car without a speedometer, 27 miles north-east of Jizan. With the surrounding villages, it has a population of 20,000, and is divided into two separate towns, in the shelter of two small tabular hills, Aqwa Yemeniya and Aqwa Shamia, in which it is stated that emeralds are to be found. The old city, composed almost entirely of the pointed huts (*'arish*) described at Jizan, lies at the foot of Jebel Shamia. The new town, which is being constructed according to the Emir's own plans, is rapidly growing in size and importance. Already the Idrisi and his two principal ministers, Yehya Zekri of the Hakami section of Beni Masareha and Mohammed Yehya Basahi, a clever man who has enriched himself considerably

at the expense of the state, have built themselves large houses of sun-dried bricks and stone faced with plaster. Sayed Ahmed el Idrisi, the originator of the Idrisi (Ahmedya) tarika, is buried at Sabya in a small qubba which is too insignificant to be considered a shrine, yet is distinguished enough to cause the orthodox some uneasiness.

In spite of an argument lasting nearly nine hours and interrupted only by five cups of green tea, each differently flavoured, the Emir refused to allow us to go north, so we were obliged to content ourselves with the country to the east and south. This belt of flat or undulating *tehama*, from which the first hills spring quite suddenly without any of the gently rising foothills of Hejaz, is broken by numerous wadis running down to the coast and gradually widening as they reach it. As I saw them from north to south, they were Wadi Dhamad and Wadi Jizan joining at the wells of Hafa'ir, which from a distance of 2 miles supply the water of the port; Wadi Khulab, with a *gara* (ridge) of the same name; Wadi Damagh; Wadi Ta'shar, which is 3 miles wide at its mouth; Wadi Heiran, with its headland; Wadi Habl, rich in cultivation since it is chiefly owned by Sheikh Sa'id Mesa'id, one of the richest men in 'Asir; Wadi Baheis, noted for the qubba of Wali Banaji and the tombs of the robbers who once made it impassable; Wadi 'Ain; Wadi Mur, with Lahiya between its several mouths; Wadi Sardud, thickly wooded with mimosa, tamarisk, and tamarind; and Wadi Anis, near Hodeida.

Of these the most thickly populated appears to be the Wadi Jizan, which contains in the first 23 miles from its mouth nine villages and the considerable town of Abu 'Arish. Eight other villages lie a little further inland, and each one averages from fourteen to one hundred leaf huts enclosed by a rough fence with a population ranging from fifty to five hundred souls. The main cultivation is in the wadis, where we saw durra, dukhn, sem-sem, many kinds of vegetables, hemp grown for acid, incense plants and ful, from which strong scent is made. As the ground-level rises, there is wheat and a little barley, while from the hills come coffee, bananas, roses, grapes, almonds, papaia, custard apples, and melons. Coarse rice is grown in the Wa'zat country, and cotton by the Hashabira tribes. The latter is long staple and the bushes are very large, but, as they cannot spin the thread in the country, the raw material makes a double journey. The Government blasts rock-salt in the smaller hills, but otherwise the only industries are weaving on prinitive handlooms, dyeing (but the colours, chiefly indigo and orange, are not fast), and the admirable metalwork of Zediya and Sabya.

All the fighting classes of the country wear locally made daggers, the sheaths of wrought gold or silver, the handles of horn set with the semi-precious stones found in the hills, chalcedony, cornelian, chrysoprase, agate, and a curious white pebble containing bits of what looks like fossilized fern. The townsfolk are divided into the ashraf and merchant folk, many of whom have migrated from Hadhramaut; the muwallad

or freedmen showing traces of black blood, but insistent on their right to be called Arabs; the slaves mostly from Abyssinia or Somaliland; the akhdam, a curious unarmed class of porters, capable of carrying 500-lb. burdens; and the typical Yemeni retainer, neither servant nor slave, slight, small-boned, clean-shaven, fair, almost yellow skinned, wearing a striped "futah," a skull cap, and a sword.

There is a saying in Yemen that women, barbers, and Jews may travel with safety, because they bear no arms; but I saw no Jews till I reached Hodeida, where I found a small poverty-stricken band of Hebrew craftsmen, chiefly from Sana'a. They are only allowed to wear a single garment like a nightshirt, and may not sit down in the presence of Arab notables. The Emir has a guard of 500 picked men from Abu 'Arish and Sabya, and these represent the purest Arab type in the country. The men, small of stature, lithe and hipless, olive skinned, have very fine regular features with long noses and good foreheads, from which the hair is taken back under a fillet and arranged in bunches of stiff ringlets on either side. The Bedawin of the coast present variations of this type, but further inland the features coarsen, and we saw men from Jebel Huras, broad shouldered and massive, who were like savages of Central Africa, with shocks of fuzzy hair, hardly any forehead, and wide thick features. The Bedawin of the Tehama wear nothing but a strip of loincloth and some sweet-scented herbs stuck in their hair. They oil their bodies all over and often carry long spears, though rifles are so plentiful in the country that the purchaser has a choice of English, German, or Italian for 12*s.* to £1.

With the exception of the great mountain confederations like the Hashid and Bekil, the Bedawin are half pagan, wild, primitive creatures, wearing black stones as amulets: Moslems only in name, with no particular tarika. I have seen them saying the Islamic prayers with their backs to Mecca, or turning devoutly to the sun. There is a good deal of nature worship and a widespread belief in omens, charms which are embedded in the flesh of the arm, ghouls, jinns, and heavenly portents. The hillmen of the great mountains are a fine race, dark skinned, Roman featured, wiry and hardy. They wear indigo-blue futah, turban, and short coat, with a sheepskin slung across the shoulders, and they will not intermarry with the people of the plains. Most of them are Zeidis (heretical Shias).

In the Tehama towns we found the most popular tarikas, besides the Idrisi, were the Rashidiya, Ghadriya, Shadriya, Moghaniya and Rifaiya, but there is little genuine religious enthusiasm. The intense hatred of strangers, which made our journey from village to village a succession of minor fights, is due more to the suspicious reserve of the natives than to fanaticism. "These are not of the sons of Adam" was the cry which followed us more often than "These are not Moslems." Nevertheless, passing as an Egyptian woman and wearing the native dress under a

habbara, I listened, especially in harems, to much abuse levelled at the unbeliever and especially the Christian.

The 'Asiri women of the upper classes are more rigorously secluded than in any other Arab country I have visited, except perhaps Kufra. They never leave their houses except to be married or buried, and both the bride and the corpse go forth by night. The townsfolk look upon the Bedawin as savages, while depending on them for most of their foodstuffs. Large quantities of cattle, sheep, goats, and a small wiry breed of camel (capable of carrying a 700-lb. load) are raised by the tribesmen who own all the land. This is worth from 100 dollars to 300 dollars a feddan, which measure is slightly larger than the Egyptian one. Three crops of durra a year, averaging a total yield of 12 to 15 ardebs per feddan, are obtained in the valleys, and, because the country is so rich in grain and livestock, prices are cheap. A camel costs £4, a sheep 6*s.*, a basket of custard apples one-fifth of a farthing, and wheat was selling at the rate of 21 lbs. for 2*s.*; durra 325 lbs. for 11*s.* There are no mules or trotting camels in the country, but a quantity of small grey donkeys are imported, and these form the chief means of transport, for the local breed of horses is very poor and small. Some of the stallions are imported from Nejd, but, with the exception of these, I saw no good horses in the country.

There are no made roads, but there is a sort of track along the coast only a few yards from the sea, which is capable of being traversed by the Emir's four Ford cars, and, some 20 miles inland, there is another track from Sabya *viâ* Abu 'Arish, Haradh, Zohra, and Zediya to Hodeida. Otherwise there is little communication, except between the villages composing a valley township. The sheikhs of one hamlet often do not know even the names of the headmen of another a few miles away. Their horizon is enclosed by the nearest sand ridge, which breaks a prospect of low scrub and coarse greyish grass, interspersed with wide stretches of desert.

We saw no wild animals save gazelle, and, except on the coast where there were flamingoes, the birds seemed to consist chiefly of hawks, vultures, falcons, and crows.

As we went further south into Yemen, the character of the country changed. The villages, with huts made like English haystacks and covered with convolvulus and pumpkin plant, were surrounded with groves of dom palms or thickets of sadab, erdh, and sandh trees. The desert gave way to thickly grassed plains, with huge shrubs of desert broom and mimosa trees, flattened and outspread like giant umbrellas. There were quantities of small wild flowers, and in some places the crops grew above our heads as we rode. This was where the Tehama, narrowing between the mighty Jebel Milhan and the coast, is absorbed by the wide and fertile bed of Wadi Sardud.

The climate did not vary much during the months I was in the Tehama.

The average noon temperature was about 84° F., but there was always a damp south wind which was very oppressive, and the temperature rarely fell more than 2° or 3° till just before the dawn, when it averaged about 75° to 76°. The rainy season is in June, July, and August, and the first sowing follows immediately afterwards. Sometimes there are showers in February, but these cannot be relied upon.

The whole life of North Yemen is differentiated from that of 'Asir by the use of kat. This shrub, *Cathula edulis*, grows at an altitude of 4000 feet, and its leaves contain the stimulating properties of strong caffeine. A regular service of fast female camels brings the precious plant daily from the hills to the lowland towns. Here there are special straw-built shelters where, in an indescribable atmosphere of heat, sweat, and smell, the whole male population smoke water-pipes and chew the leaves for the three noon hours. The rich man spends up to £1 a day on kat. The beggar demands, not alms, but a few leaves of kat. The short period of stimulation is followed by restlessness. Nobody sleeps till late in Yemen. Therefore no work is done till the sun is high next morning, and any one wishing to travel fast wait till after the third (aysha) prayers, when the first effects of the drug are at their height. Kat seems to affect the whole nature of the people. The simplicity, morality, and the strict sumptuary laws of 'Asir do not exist in North Yemen. An old Sayed counted up one hundred wives for my benefit, for the facile Islamic divorce is a habit south of Midi. There are shrines at Munera, Marawa, Mansuriya, and Qutai' with their (munasib) guardians, who are credited with supernatural powers. The mosques, such as that of Lahiya, are large and ornate with many domed roofs. There are cafés where audh players entertain the smokers. It is a life of lotus eaters, where as little work as possible is done and women are seen in the streets, their garments sewn with little gilt bells that tinkle as they move.

We came upon very few traces of antiquities during our journey. At Ibn 'Abbas there is a broken tablet with cuneiform inscriptions. At Midi a marble cow had been dug up some time previous to our visit, and, during a recent wash-out at Haradh, some stone dogs of various sizes had been brought to light. Coins, both Sabæan and Himyaritic, are found fairly frequently. In the grass country a mile from Midi there are a quantity of graves which are supposed by the more intelligent ashraf to be pre-Islamic. They consist of monolith blocks of coral rock without inscriptions, some 8 feet by 3 feet above the ground. The graves are outlined with other blocks.

[NOTE: the spelling of names in the above paper has been assimilated as far as possible to the R.G.S. II. System, but, owing to the absence from England of the author and the want of the original Arabic, some of the spelling is conjectural.—ED. *G.J.*]

A HITHERTO UNKNOWN WORLD MAP OF A.D. 1506

Edward Heawood, Librarian, R.G.S.

Map following page 320.

AS announced a few days ago in the *Times*, the British Museum has been so fortunate as to acquire by purchase a hitherto unknown map, of a date which in itself is bound to attract to it considerable attention, since it places it among the first examples known in which an attempt has been made to set out in printed form, and thus make accessible to the public at large, the great discoveries of Columbus and other contemporary navigators. And more than this, until some possible further discovery may once more shift the distinction to a still earlier document, it may apparently claim to be the very first printed map in which the discoveries in the New World are represented at all, since the date 1506 places it a year before the great map of Waldseemüller (a more imposing production, it is true) discovered by Father Fischer in 1901, to which the priority was then transferred from the map of Johan Ruysch, printed in 1508. The questions that naturally arise as to its authorship and sources are therefore worthy of careful study.

The date appears, in the somewhat unusual form " 1506 notum," at the end of an inscription placed in the ocean near the southern end of Africa; and whatever the precise meaning of the phrase may be, it certainly shows that the map was compiled, and probably actually printed, in the year named. In every respect the contents of the map are just such as we might expect to find in one made in the opening years of the sixteenth century. In the same inscription two separate individuals are credited with its production, but the phrases indicating the respective parts played by each are unusual, and in themselves would hardly permit us to say definitely which was the compiler—that is, the true author—and which the draughtsman or engraver. After saying that the 180° of the Earth's circuit shown by Ptolemy had been extended by another 180°, so as to complete the circumference, the inscription states that this had been done " diligentia joani mathei Contareni; Arte et ingenio francisci Roselli florentini." The presumption certainly is that the first-named is the author, Roselli the engraver and publisher, and it becomes a virtual certainty when we read a second inscription placed at the left-hand end of the map, in which, in somewhat halting verse, it is said: " orbem terrarum in planam et maria omnia mappam . . . redegit . . . Ianus Matheus ptholomæa (?) inclytus arte Contarenus." Now though we know something (if not much) of the cartographical work of Roselli, the name of Giovanni Matteo Contarini appears to be quite unknown in connection with cosmographical studies, and this alone is a point of interest. All

the well-known bearers of the name seem to have belonged to Venice, where various members of the family had risen to the highest position in the State, while others were persons of influence. We know of a painter and engraver Giovanni Contarini of a later period (born 1549), but it is useless to speculate on a possible relationship between this man and the author of the map,* though careful research might solve the question. It is perhaps worth noting that in the fifteenth century one Alessandro Contarini wrote a memoir 'Della Milizia Marittima,' which is preserved in the Biblioteca Marciana at Venice, showing that one member of the family at least had turned his attention to nautical matters before 1500 (see Uzielli and Amat di S. Filippo: 'Studi Biografici e Bibliografici,' ediz. 2ª, vol. 2, p. 287).

Of Roselli's workmanship at least two maps have been known previously, one having been reproduced before the middle of last century by Santarem, and again some years later in the great 'Raccolta Columbiana' brought out in Italy in connection with the Columbus quatercentenary in 1892. The American portion of the same map was also given by Harrisse in 1900 in his 'Découverte et Evolution Cartographique de Terre-Neuve,' together with the corresponding part of still another map by Roselli belonging to a collection owned at Florence. Both show an unmistakable likeness in certain features to the newly found map, though the projection is different in all three. Those previously known are smaller and less full of detail, and as both are undated their precise place among early sixteenth-century maps has hitherto been undetermined. The first is known from its inclusion in the 'Isolario' of Bartholomeo "da li Sonetti" (as he seems to have been called) when this was re-issued in 1532, but it has no real connection with this work and has been justly considered as of earlier date. The 'Raccolta' also printed an anonymous distich in praise of Roselli's skill as a cartographer, in terms which somewhat recall those used of Contarini in the B.M. map; and we learn from other sources that he was youngest brother of the well-known painter Cosimo Roselli, and thus member of an important Florentine family; also that he was a miniaturist, painter, printer, cosmographer, and cartographer, born about 1445, who travelled extensively before settling down in Italy, and died in the first quarter of the sixteenth century.† I am indebted to Prof. Thomas Ashby of the British School at Rome for calling my attention to what is thought to be another piece of Roselli's work, namely a large panoramic view of Florence, of which

* I am informed by the Department of Engraving at the Victoria and Albert Museum that the artist signed his name in the same latinized form "Contarenus."

† That he settled at Venice after visiting Hungary is stated by Dr. Marzi in the paper referred to below, but on what authority does not appear, other writers speaking of him as if resident in Florence for the most part. In J. W. Bradley's 'Dictionary of Miniaturists, etc.' there is a notice of a Francesco Rosselli, said to have been *eldest* brother of the painter Cosmo, and to have collaborated with Liberale of Verona in illuminating the choir books of Siena.

a single woodcut copy exists in Berlin. Its authorship has been discussed by various writers, particularly by Hülsen in the *Jahrbuch der K. Preussischen Kunstsammlungen* for 1914, pp. 98 *sqq.* (see also *Mitt. des Kunsthistorischen Instituts in Florenz*, vol. 1, p. 62). In the latter publication (pp. 154, 216) it is also conjectured that Roselli was responsible for a view of Rome, and it seems quite probable that copies of these views were among the contents of the shop of his son spoken of in the next paragraph. The original drawings are thought to have supplied the models for the views of Florence and Rome in Schedel's 'Nuremberg Chronicle' of 1493.

The son, we are told, Alessandro di Francesco Roselli (or Rosegli) kept a shop at Florence for the sale of books, maps, globes, engravings, and other objects, and three years after his death in 1525 an inventory of its contents was taken in the interest of his two orphan children. The parts of this concerned with maps and cognate material were printed in 1894 from the original document by Del Badia, in Part XIV. of his periodical *Miscellanea Fiorentina* (vol. 2, completed 1902), but unfortunately this gives no clue to the authors, but only to the subjects, of the maps.* It would have been interesting to know whether the elder Roselli's map of 1506 was still on sale by his son in 1525. The list includes various planispheres both large and small, and one is stated to have been in two sheets (as is the B.M. specimen); but as the size of the sheets is given as "royal" they would seem to form a larger map than this, even allowing for the lost margins.†

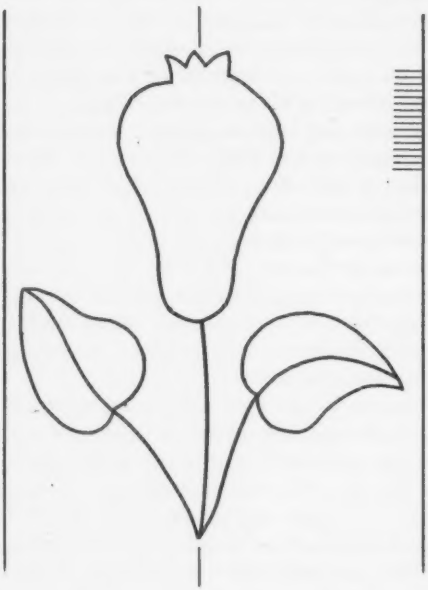
The question naturally arises, To which of the maps made by Roselli does the priority belong? and though this cannot be answered with certainty everything points to the conclusion that in the B.M. map we have the first of the series. The mere fact that it is far fuller of detail shows that it cannot have been a simple copy of the others, and it is unlikely that, Contarini being the real author, his name should not have appeared in the earlier versions (supposing the smaller maps to have been such), while mentioned in the later. The converse supposition—that Roselli, who had engraved the first and more elaborate map for Contarini, should afterwards have reduced it to suit purchasers who

* Even as it stands the list tells enough keenly to whet our curiosity. If, as seems possible, the maps were all the work of Roselli himself, he would take a very high place among his contemporaries for output. Besides many entries of navigation charts and "appamondi," large and small, we read of maps and plans, some in many sheets, about which it is tantalizing to have no further particulars. There are maps or plans of Italy, Florence (in six sheets royal), Rome (in twelve sheets royal), Constantinople, and India, besides a large planisphere in sixteen sheets "ordinary."

† The exact sizes of the papers used in quite early days in Bologna is known from the marks on a marble slab preserved in the printing office of the Merlani of that city (Briquet, 'Les Filigranes,' pp. 2–3). The "royal" sheet then measured 615 × 445 mm., or about 24 × 17½ inches, but the size seems to have varied somewhat. In the paper quoted above Hülsen gives the royal "format" as only 29 × 44 cm., but this must surely be when *folded*.

preferred a cheaper edition, is far more probable. Further considerations, to which we will recur presently, also support this view.

Whether the map is to be considered a product of Venetian or Florentine cosmography is a question difficult to answer, one of the collaborators seeming to have belonged to Venice, the other to Florence (or to both cities at different times). It has been remarked as singular that so few specimens of Florentine work in this field are known to us from the Age of Discovery, although Florence, by her extensive commercial relations with the rest of the world, had been caught in the full tide of new thought and geographical knowledge set flowing by the Spanish and Portuguese discoveries. We might therefore be tempted to regard the present map as one of many documents, probably issuing from Florence, of which the greater part are now lost. In favour of this view, besides the Florentine extraction of Roselli, is the indication supplied by the water-mark of the paper used for the map. This represents a pear-shaped fruit with leaves attached to the stalk (see reproduction), and its particular form proves the paper to have been almost certainly made in Tuscany;



for though, as Briquet has shown, this general class of water-mark had a great vogue in Italy for a century and a half (1433–1590 at least) the examples most nearly agreeing with the present, in form and also in date, come from papers used at Florence (1507), Lucca (1516–18), and Pisa (1518–20). An almost identical mark occurs too in the paper of an anonymous engraving of the *Florentine* school described by Mr. Hind in his Catalogue of Italian Engravings at the British Museum. In connection with the place of origin attention may be called to a paper presented to the Third Italian Geographical Congress of 1898 by Dr. Demetrio Marzi, who quoted a document in the Florentine Archives showing that as early as 1509 a map and globe, apparently made in Florence, were in the hands of Aloise (Luigi) Guicciardini (brother of the historian Francesco), who was in close

touch with commercial circles at Lisbon and elsewhere, and thus had the best chance of acquaintanceship with the new geographical knowledge. Dr. Marzi mentioned the then-known map of Roselli as a Florentine production of the time, but gave a negative answer to the question whether this (or a map like it) might be regarded as the map referred to. He held rather that Guicciardini had in his hands a nautical chart showing the new discoveries more correctly than by Roselli. But the mention of a globe as well proves that not only a MS. chart was in question, and in fact suggests the possibility that the map and globe of Waldseemüller of 1507 had already reached Florence in 1509. But it is at least possible that the newly found map may be the one spoken of.

On the other hand the mere name of Contarini points rather to Venice as the place of origin, especially in view of the statement that Francesco Roselli resided there during part of his life. It is worth noting that we have a positive assurance that a map showing the new discoveries was brought out at Venice before 1508 at least. When discussing the smaller, undated, map of Roselli, Harrisse (*op. cit.*, p. 67) made the acute suggestion that the map referred to by Beneventanus, in his treatise printed in the Rome Ptolemy of 1508, as having lately appeared at Venice, may have been a work of Roselli; and the finding of the present map lends some support to this notion. That Venice is marked, but not Florence, is singular in either case, seeing that Roselli was, by birth at any rate, a Florentine. The points in favour of Florence and Venice seem therefore almost evenly balanced, unless it be thought that the Tuscan origin of the paper outweighs other considerations. The difficulty might perhaps be met by supposing the map to have been drawn at Venice and sent to Florence to be engraved.

To turn now to the map itself. At first sight it at once recalls the well-known map of Johan Ruysch, probably made in 1507, and published in the Rome Ptolemy of 1508, though it is somewhat larger, measuring 630×420 mm. in its present condition. Not only is the projection, which gives the map the shape of an open fan, almost identical in both *—though Ruysch's map (with its small copy in MS. by Glareanus) has hitherto been the only known map to employ it for a general map of the world—but there is a striking feature in the geography which is the same in both, namely the great north-eastward extension of Asia to join the new discoveries of the English and Portuguese in the Greenland–Newfoundland region. But all idea that one might be merely a copy of the other is negatived on closer inspection, which shows that while the same sources must no doubt have been drawn upon to some extent by both map-makers, they otherwise worked independently. Contarini gives no hint of the great Arctic Islands which are a special feature of Ruysch's map,

* In both also the median line practically separates the Old from the New World, whereas Waldseemüller in 1507 put the Old World in the centre, with the new extensions at both ends.

and were copied from him by Mercator. In the construction of the degree-net there is a certain difference. Both used a conical projection, but while Contarini used a form of this in which the pole appears as a circle, Ruysch chose the special case in which the apex of the cone coincides with the pole itself, in which therefore all the meridians meet. Another small difference is the insertion of every fifth degree of latitude and longitude by Ruysch in place of only each tenth. It should be mentioned that one of Roselli's smaller maps is also noteworthy for the projection adopted, which gives the map the oval form so often seen in sixteenth-century maps, including some of Ortelius's. Of this the earliest example is usually said to be Bordone's of 1528 (probably made a few years earlier), so that Roselli's is almost certainly older, and two out of his three maps are probably the earliest (of known maps) to use their respective projections. The use of the oval projection for the small map of Roselli is perhaps a slight indication that it was made *after* the fan-shaped map, though the point must not be unduly stressed.

As regards the geography the map is avowedly an attempt to graft the new data on to the old Ptolemaic stock, and it therefore falls into the same category with other maps in which this attempt has been made, notably Waldseemüller's of 1507. It retains errors escaped by the makers of nautical charts, who gave attention chiefly to the coasts, and made little or no attempt to supply a complete picture of the world, as did the others. Contarini's Asia repeats the broad features of other maps of its class, being based like them on Ptolemy, or on Marco Polo and other mediæval travellers. We find the same vast imaginary peninsula in the south-east, due to the retention of Ptolemy's eastern coast-line of the Indian Ocean after his Terra Incognita to the south had been eliminated. To examine the nomenclature and legends in detail would take us far beyond the limits of the present paper, but certain points may be noted. Whilst the common use of the MS. and published editions of Ptolemy (with the included maps), and of Marco Polo, would account for a close general resemblance with other maps of the time, the identity in some details forces on us once more the conviction that common *map*-sources, not now known to us, must have been drawn upon too, as was held by Dr. Ravenstein when discussing the sources of Behaim's globe. It is highly improbable that map-makers taking their data directly from Polo should have made such a similar selection of names and statements as we find *e.g.* in Contarini and Waldseemüller. Yet Contarini in 1506 could not have used Waldseemüller, nor could the far more elaborate picture given by the latter in 1507 have been derived from Contarini. An identical feature in this group of maps, which could not have been based on mere textual description, is the representation of the large islands named Madagascar and Zanzibar, in the southern Indian Ocean, in precisely the same way by Behaim, the Laon Globe, Waldseemüller, and (as we now find) by

Contarini. (On the same basis of Polo's *narrative* they are shown quite differently, with the positions actually reversed, in La Cosa's chart of 1500.) On the other hand there are sufficient differences and details peculiar to one or other of the maps to show that they have not been directly copied among themselves.*

For the size of the map it is remarkable how much detail the author has contrived to put into the interior and east of Asia, about which his data are fuller than those of most of the smaller maps of the time. Many of the legends refer to the products of the several regions or to the faith of the peoples spoken of—whether Christians (Nestorians) or Idolaters; and quite a number are given in almost the same words as by Waldseemüller, though in slightly shortened form as necessitated by the smaller space available. A few are not to be found (apparently) in the latter, as, *e.g.*, the mention, in the very centre of the continent, of the "oppidum siue præsidium eorum qui apud Seras proficiscuntur." In the centre and west such scraps of actual information taken from the mediæval travellers are strangely mixed with the vague and semi-mythical data due to Ptolemy and other ancient writers. As in Waldseemüller we still have the altars of Cæsar and Alexander, and the columns of the latter, located by Ptolemy in the region north and east of the Sea of Azov.† The trace of another legend indirectly connected with Alexander is to be seen in the "Judei Clausi" already placed in the far north-east of Asia by Martellus (*c.* 1490) and shown also by Waldseemüller and Ruysch (by the last as "Judei inclusi"). As Yule has shown, in his notes dealing with Marco Polo's references to the nations shut up by Alexander and the country of Gog and Magog (Book I., chapters iv. and lix.), there is an extraordinary jumble of legends in regard to the "shut-up nations," arising in part from a confusion between the wall supposed to have been built by Alexander across the pass of Derbend on the Caspian shore to keep out the wild peoples of the north, and the Great Wall of China.‡

* A mistake is made by Contarini in copying Ptolemy, which is not found in any of the other maps, or in the printed editions of the 'Geography.' The number of islands round Ceylon is put down as 1778 instead of 1378, and as the hundreds figure is in the form of seven C's, this cannot be merely a slip of the engraver.

† A good deal of confusion seems to have existed in old days between the pillars of Alexander and the *eastern* pillars of Hercules, referred to by Chaucer in a passage in the Monk's Tale (see an interesting discussion of this by Mr. G. L. Kittredge in the volume of essays presented to Dr. F. W. Putnam in 1909; also *Journal*, vol. 36, p. 107). The legend connecting Alexander with the eastern pillars is to be found, according to Mr. Kittredge, in the 'Res gestæ Alexandri' of Julius Valerius, and in other early writers.

‡ In the earliest appearances of the legend on maps Jews are not spoken of. The Ebstorf map of about the thirteenth century still places Gog and Magog, the "immundae gentes" shut up by Alexander, just north of the Caspian, but in the Catalan map of 1375 we already find them in the far north-east, Gog and Magog having been identified with the Tartars. On the other hand the Tartars were also identified (as by the Emperor Frederic II. in a letter to Henry III. of England quoted by Yule), with the lost ten

As in Waldseemüller (and previously in Martellus) we find a large river Polisarcus in northern China, this being apparently its first appearance in an engraved map. It evidently represents Polo's name (*Pulisangin*, a " stone bridge," in Persian) for the bridge of twenty-four arches over one of the minor rivers west of Peking, a picture of which had been given in Fra Mauro's great map of 1457–59. The name, which Ruysch applied also to a gulf in his north-east extension of Asia, long remained on the maps as that of one of the great rivers of Eastern Asia, and it appears too in Pinto's travels as *Puxanguin*.

For a great part of southern Asia no attempt is made, any more than by Waldseemüller, to improve upon Ptolemy, despite the existence of new material in Portuguese charts like Cantino's and Canerio's. But in one point Contarini goes beyond the German in his not very successful endeavour to insert the Indian peninsula, virtually ignored by Ptolemy, whose greatly exaggerated Ceylon (Taprobane) left him in fact no room for the peninsula in its proper place. In the maps based on his data, *e.g.* in the somewhat crude Genoese map of 1447, a slight indication of the peninsula (with the name India in the map quoted) is to be found to the west of Ceylon, but still east of the Indus. Instead of showing a better-developed India in this position, Contarini retains this representation, and inserts a larger prominence *west* of the Indus, close to the entrance to the Persian Gulf.* He means it for India, as he marks on the west coast Calicut, Cananor, and another name apparently meant for Koulam or Quilon, all being important towns visited by Vasco da Gama; and he shows a small Ceylon in correct relation to the peninsula while retaining the big Taprobana of Ptolemy. Some such duplication was no doubt responsible for the transfer of the name Taprobana to Sumatra in later maps. In the whole of southern Asia Contarini is distinctly behind Ruysch, though slightly better than Waldseemüller in the one respect spoken of.

Turning to Europe, we are struck at once with the general excellence of the outlines, which, in spite of the smaller scale, are in some ways better than Waldseemüller's. The undue narrowing of the land space between the Black Sea and the Baltic, seen in Waldseemüller and other map-makers who followed Ptolemy, gives place to more correct pro-

tribes, and the shut-up nations thus became Jews. The idea may have been in part derived from the passage in the Apocrypha (Esdras ii. 13) which told of the migration of the ten tribes, and was given by Ortelius as his authority for placing Jews in north-east Asia. Speaking of the Israelite captives in Assyria in the days of Hosea Esdras says: " They took counsel among themselves that they would leave the multitude of the heathen and go forth into a further country where never mankind dwelt "; and " through that country there was a great way to go, namely of a year and a half, and the same region is called Arsareth " (as it is named by Ortelius).

* A comparison with the maps given in Sylvanus's Venice edition of Ptolemy in 1511 shows a rather striking agreement with Contarini in this part, though no modern names are given in the Indian peninsula by the former.

portions. This result has been reached partly by curtailing the extent of the Baltic in longitude, partly by a northward shifting of the whole of northern Europe, which actually brings the extreme northern coasts beyond 80°. The relative correctness of proportion is not, therefore, matched by accuracy of geographical co-ordinates. The failure to fit the outlines more successfully into the degree net may perhaps be explained thus. Ptolemy, as is well known, greatly overestimated the extent of the Mediterranean in longitude, and by following him in this respect Contarini obtained too large a standard of measurement throughout; and in order to keep the more correct proportions supplied by the nautical charts (which had no degree net at all) it was necessary to exaggerate the distances in latitude as well as longitude, with the result noticed.

For the whole of the Mediterranean basin we find the same just proportions, again showing that good use had been made of Portolano charts, of which so many were available in Italy. This is particularly noticeable in the trend of Italy and the Adriatic, for which Waldseemüller was still content to follow Ptolemy. The interior too is fairly well shown, and a good number of rivers and mountains, countries and towns, are more or less correctly placed. For Central Europe Contarini could perhaps draw upon an earlier printed map, in that of Cardinal a Cusa, printed at Eichstadt in 1491,* and for Italy, France, and Spain he had at least the modern maps in Berlinghieri's Ptolemy printed at Florence about 1480, which were wonderfully good for their time. But many even of later map-makers showed far less wisdom than he in their choice of material. The British Isles are shown as in the nautical charts, Ptolemy's distorted Scotland, retained by Waldseemüller, being given up. In the extreme north the Scandinavian region is shown, as by Waldseemüller, after the pattern set by Claudius Clavus nearly a century earlier, and already taken over from him in the MS. maps of Donnus Nicolaus and Martellus. Greenland is however misplaced (as by Nicolaus and Waldseemüller, but not Martellus) so as to lie north instead of west of Scandinavia. Like the models from which he has copied, and so many of his successors throughout the sixteenth century, Contarini uses the corrupt form of the name, "Engronelant," due to a strange misunderstanding of *Eyn Grönenlandz aa* ("a Greenland stream")—words occurring in a verse placed by Clavus round the Greenland coast-line.

In Africa the general correctness of outline is once more very striking, and here too Contarini is decidedly better than Waldseemüller in 1507. The latter so broadened the western limb of the continent that the equator

* Some have thought that the map was not actually published till the next century. Anyhow there is no definite indication of a knowledge of this map on the part of Contarini. Whilst Cusa made both the Rhine and the Elbe flow much too nearly due north Contarini errs in the other direction, giving both rivers far too much of an east-to-west trend. Bohemia, brought too far west by the former, is equally too far east in the latter.

ran through it, and Cape Palmas was brought down to almost 15° S., in place of about 4½° N. He in this way added a full 10° to the length of the continent from north to south. Contarini (like Canerio and others) makes the equator run almost through Cape Palmas, and is thus far nearer the truth. In the geographical details the combination of old and new data is again a principal feature, almost the whole nomenclature of the interior being taken from Ptolemy. The comparatively few names on the outer coasts are derived from the Portuguese navigators, or the charts showing the results of their voyages, but the selection seems to have been a more or less haphazard one, as indeed it was in most of the smaller maps, including Ruysch's. A few of the names given are not to be found even in the copious nomenclature of Waldseemüller, or appear there only in a corrupt or mutilated form. Even the first name on the coast of Morocco, that of the small town of Arzilla, is not given by Waldseemüller, though marked on most of the early charts from Benincasa on. The next name, C. deca, is not found in the earlier charts unless it represents their C. de ager or de guer, but curiously enough it appears, in Contarini's spelling, in Waldseemüller's Carta Marina of 1516. The more important names, like C. de bugador (Bojador), C. bianco (Blanco), the Canaga (Senegal) river, Cavo verde, Castel della mina, are naturally found in most early maps, though the last appears in Waldseemüller (1507) as Castel only. The Volta river (R. della uolta in Contarini) appears in more or less correct form in most of the charts. The next modern name on the Guinea coast, the Rio dos Scravos, is given in correct form by Contarini, as already by Martellus and Behaim, though corrupted in Cantino, Canerio, and Waldseemüller to Rio de ascansos, or something similar. Much study would be needed to determine whether any one of the still existing charts has been specially used. Whilst Harrisse could find no trace of the use of a chart like Cantino's in the American portion of Roselli's smaller maps, one or two of the African names on the newly found map recall Cantino's rather than any other chart. The Punta da toffia just north of the Senegal is given just so by Cantino, but as Porto deto by Canerio and his copyists; and the C. de Gallos south of the Cameroons (which last is not named) has its counterpart in the Put dos garlao of Cantino. On the lower Guinea coast, C. de lopo gonzalus (for Gonçalves) is generally found (though corrupted by Ruysch to "Gotsalin"), as are also the C. (or Mons) Negro (where Cão set up a pillar) and the C. das areas, a little beyond. On the west coast Contarini is on the whole better than Ruysch, but on the east the latter has the advantage, as he marks all the principal ports touched at by the Portuguese, while Melindi only is shown by the former.

Although almost the whole interior geography is Ptolemaic there is one striking innovation which deserves to be specially mentioned on account of the influence it long continued to exercise on the map of

Central Africa. Here too Contarini anticipated Waldseemüller, whose map of 1507 has hitherto been the earliest known printed map to show it. We refer to the extraordinary southward misplacement of the Blue Nile system. Something of the sort is to be found in Fra Mauro, whose wonderful map showed a knowledge of Central African geography not bettered, for extent at least, for very many years. He already showed the Blue Nile with its lake-source and remarkable curve—the name Abavi given by him to the river, as well as its general relationship to the geography of the Abyssinian region, identifies it beyond question—but the circular form imposed upon his map brought it altogether out of proportion, so that we have no standard of reference for estimating the amount of displacement of any feature, especially as he omitted, or reduced to a negligible quantity, the Ptolemaic headstreams. These are retained by Contarini, who grafts the Blue Nile system on the old stem in the far south-west, making of it a great *western* branch reaching down to some 18° S. lat. This is no doubt based upon some early map or maps then existing in Italy, of which we have not been without hints from other quarters, *e.g.* the mention of a lake-source "Saaph" in the Berlinghieri Ptolemy of *c.* 1480.*

It is full time to pass on to the American portion of the map, which many will no doubt consider its chief point of interest. And it may well be so regarded, if we reflect that it may have been through the medium of this very document that many of the stay-at-home students of the time gained their first even partially correct notion of the meaning of the great discoveries in the western world. Those in touch with nautical circles had already learnt the lesson from the nautical charts on which Contarini of course based his picture, though his version does not closely agree with any one of them now known.

The priority of the newly found map to Waldseemüller's is emphasized at the outset by the absence of the name America, first used by the latter for the New World. There is no indication that Contarini had grasped the existence of any continuous or even nearly continuous barrier of land, shutting the way to Cathay by sea, though he is fully alive to the possibility that South America may be a vast continent. Whilst La Cosa's Spanish chart of 1500 showed land stretching round the far side of the West Indian Islands, unbroken anywhere save possibly where the picture of St. Christopher masks the coast-line, and while charts like Cantino's and Canerio's gave indications at least of a land beyond Cuba, there is nothing of the sort in the present map, but a wide sea both north and south of the islands seems to offer an open passage to

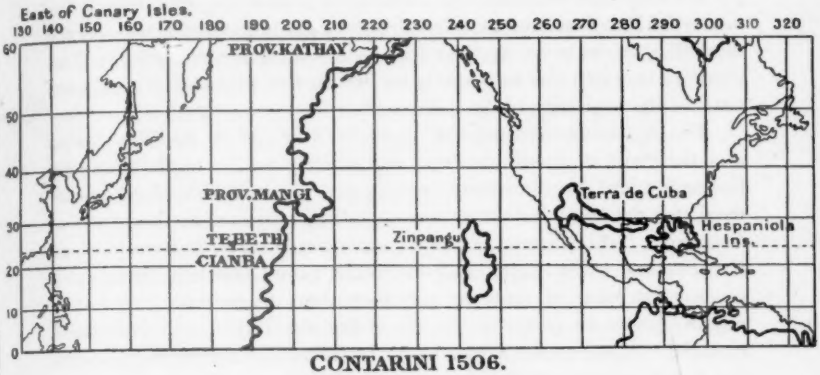
* The connection of this with Contarini's lake-source is proved by the application of the name Sacaff (Sachaf, or Saphet) to what is obviously the same feature by Waldseemüller and many others. The last-named did not, it is true, actually join this branch to the Nile system in 1507, but made it end in a lake to the west of the White Nile; in his map of 1516, however, he continued the western branch right on to join the main Nile abreast of Meroe Island.

Cipangu and Cathay. The maker evidently shared the opinion, held by Columbus towards the end of his life, that the latter had actually reached the Asiatic coasts—a belief already expressed graphically in the rough sketch by Bartholomew Columbus in 1503. This is shown by the inscription—the most prominent in the whole map—placed off the south-east coast of Asia, stating that Columbus had reached the province of Ciamba, *i.e.* the old kingdom of Champa in Indo-China, to be found in all the early attempts to set down this part of the world on Polo's authority. This indication of the view current in Italy in the very year of Columbus' death is of considerable interest.

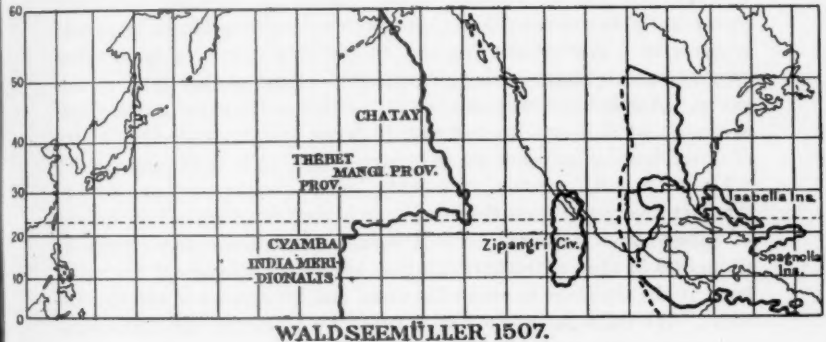
The accompanying diagrams show graphically Contarini's idea of the Pacific as compared with those of his nearest contemporaries. We see that he avoids to some extent the great eastward shifting of the coast of China which tended to a reduction of the true breadth of that ocean. On the other hand he brings the West Indian Islands much further west than does Waldseemüller, so that he makes much the same interval between the west point of Cuba and the coast of China. Ruysch gives to Hispaniola just about the same position in longitude as Contarini, but by giving a maximum eastward extension to China he reduces the ocean space to a minimum, placing in it but one piece of land to take the place of Cuba, Canerio's continental coast beyond, and Cipangu (Japan), which last, as he tells us himself, he purposely omitted as believing in its identity with Hispaniola.

The omission of any land west of Cuba is remarkable in a map probably printed at Florence, the city of Vespucci, whose voyages were first described in the letter sent thither to his compatriot Soderini in 1505 or 1506, as is supposed. For many have taken the land shown by Cantino and Canerio to represent Vespucci's discoveries in the extensive voyage which he claimed to have made on the coasts of North America in 1497–8. Those who doubt the authenticity of the voyage may be confirmed in their scepticism by the absence of any such land from a map made in 1506, for which a Florentine was in part responsible. Even if the date assigned to the printing of Vespucci's letter be too early, we should have certainly expected the general results of his voyages to have been known in Florence in 1506. Another point to be noted is that the only name applied to South America by Contarini is "Terra S. Crucis," the name first given to north-eastern Brazil after its discovery by Cabral (which discovery is recorded on the map in a legend of which the conclusion is unfortunately lost). Both Ruysch and one of the smaller Roselli maps add the alternative "Mundus Novus," the term specially applied to the western continent by Vespucci himself. Both these omissions appear to indicate that one of the earliest type of charts of the West Indies was in the main followed by Contarini.*

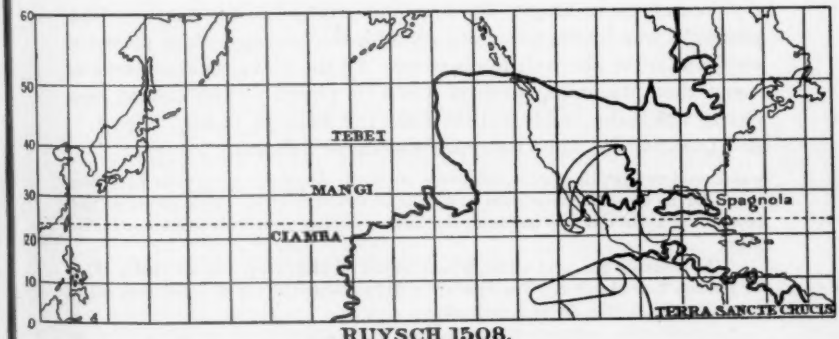
* It is interesting to observe that the map given by Sylvanus in the Rome Ptolemy of 1511, which we have already seen to offer some points of resemblance with Contarini,



CONTARINI 1506.



WALDSEEMÜLLER 1507.



RUYSCH 1508.

THE OUTLINES OF CONTARINI, WALDSEEMÜLLER, AND RUYSCH, SUPERIMPOSED ON THE TRUE OUTLINE

We may here note that the mutilated legend telling of Cabral's discovery of Brazil assigns that discovery to 1499 instead of 1500. As the landfall was made on April 22 (three days after Easter, which fell on April 19 in 1500) this can hardly be due to the adoption of a different date for the beginning of the new year.*

The American nomenclature is almost confined to the West Indies and the coast of South America immediately to the south, traced by Columbus and his immediate successors. The omission of all precise detail for the coast further east and south is singular, as the results of Vespucci's " third " voyage in 1501 were already set forth in the Cantino, Canerio, and other charts, and one might almost conclude there was a studied intention of ignoring the Florentine, though an explanation might perhaps be found in the use of Spanish rather than Portuguese material. Many of the names are to be found in Cantino and Canerio, but a few are not, so that in any case these have not been the actual sources. The use of " Terra de Cuba " in place of " Isabella " is unusual in the early Portuguese charts, but occurs in the specimen known to students as " Kunstmann No. 2 " (apparently drawn by an *Italian* copyist), which Harrisse thought to represent the earliest type in this group. Another link with this is the insertion, in the form La Dominga, of the island of Dominica (afterwards shown also by Ruysch). Traces of direct Spanish influence are to be seen in the " Yla *de los* gigantes," † " Yla *del* brassil," where Cantino and Canerio use the Portuguese form. Another divergence from the usual type is the form Hespaniola, instead of Spagnolla or Espanola. The Bocha del Drago, the name given by Columbus in 1498 to the northern pass between Trinidad and the mainland, is already to be found in La Cosa, and is repeated in the Cantino chart. We miss the name Paria, heard by Columbus as that of the mainland tract opposite Trinidad, but in the legend describing the productions of the country to the west find mention of the pearls (" Margaritas ") seen by the Genoese during his third voyage, which proved so strong a lure to his rivals in discovery. Of the island names, it may be noted that Macubiça, north of Cuba, is placed further east in most charts, which also, in place of the Baios (*i.e.* Bajos or Baxos, " Shoals ") de Cuba have the name Babuca, Babueca, or Babacoa.

was considered by Harrisse (' Discovery of North America,' p. 293) to have been based for its transatlantic portion on a chart of this early type. It too shows no land beyond Cuba, but this may be merely due to the fact that the map itself goes no further west.

* At Florence the year seems to have begun on March 25, and at Venice either on January 1 or March 1. The date of Cabral's *sailing* (March 9) would thus fall in 1499 according to the Florence reckoning.

† In this name, assigned to an island off the mainland coast, we might think we have a solitary trace of Vespucci's influence, the name being first used in his account of his " second " voyage in 1499. But this was a joint voyage with the Spaniard Alonso de Hojeda, and though no Spanish narrative of the voyage exists, the results no doubt found their way into Spanish charts

In the north the very similar drawing of the combined Greenland (or Labrador) and Newfoundland by Contarini and Ruysch (copied also in Roselli's smaller maps) points conclusively to a common origin, though the nomenclature curiously has nothing in common. Besides the usual statement of discovery by the Portuguese, Contarini gives only two names, neither of which is to be found in Ruysch. The Terra de Caramella on the northern part is explained somewhat unconvincingly by Harrisse as land of icebergs (" glaçons), through the meaning " ice-creams " attached to the Portuguese term. The other name, " Rio de Rosas," makes its first appearance on the third of the Kunstmann charts, thought to have been made by the Majorcan Salvat de Pilestrina in 1504 or 1505; but the origin of the name seems uncertain, and it soon dropped out of the map. This is another indication of Contarini's use of a quite early type, and once more confirms the date 1506 as that of the making of his map.

The above notes are suggested by a somewhat hasty examination of the map, and some of the conclusions may be negatived by a more exhaustive study. But there is no doubt about the interest attaching to the document, and the Map Department of the British Museum is to be warmly congratulated on having secured so valuable an addition to the national collection. To Mr. F. P. Sprent of that department the present writer owes hearty thanks for much help and valuable suggestions received from him during the preparation of this article.

Note.—As the priority for the representation in print of the new western discoveries is here claimed for the Contarini map, it may be well to recall the fact that a map, probably by Waldseemüller, discovered over twenty years ago by Mr. H. N. Stevens, is thought by him to be earlier than the big map of 1507, and to have possibly been printed in 1506 (see *Journal*, vol. 19, pp. 205–9). But as Mr. Stevens has not yet made public his detailed arguments in support of this view it is obviously impossible to discuss the question of priority as between this map and Contarini's.

GEOGRAPHICAL DETERMINATIONS OF THE CANADIAN ARCTIC EXPEDITION

F. A. McDiarmid, Geodetic Survey of Canada

IN the *Geographical Journal* for October 1921 Mr. Vilhjalmur Stefansson has outlined the several journeys of the Canadian Arctic Expedition of 1913–1918. In this present article it is the intention to give a short description of Mr. Stefansson's instrumental equipment, the methods he employed in determining longitude, latitude, and azimuth, to show how the observations made in different years were related to one another, and finally to point out the changes which have been made

in the previous maps, both as to addition of new lands and differences in the outlines of coasts previously marked. [*Note:* The principal changes were shown in red on the map published in the *Journal* for October 1921. The detailed charts are deposited in the Map Room.]

The determinations of longitude, latitude, and azimuth by an exploratory survey have not the precision of observations made at a well-ordered observatory, but yet when many of the old discoveries which first were mapped from observations made with the sextant and chronometer were later re-determined with the more modern equipment discrepancies of only a small order have been found. On an expedition such as the Canadian Arctic Expedition it would have been impracticable to burden the party with a large astronomical outfit. When everything has either to be carried on dog sleds or back-packed it is absolutely essential to reduce the equipment to the minimum. The Canadian Arctic Expedition lost much of its valuable equipment when the *Karluk* was lost. The instrument outfit used by the expedition during the years 1914–18 consisted of two sextants, two chronometers, some barometers, and prismatic compasses. The longitudes determined were all by the chronometric method.

When two places of known longitude were visited the chronometer rate was obtained by a comparison of the chronometer corrections at the two places, applying the difference of longitude and dividing by the elapsed time. In 1914, 1915, 1916, and 1917 this condition obtained, but in 1918 the ice drift party under command of Storker Storkersen departed from and returned to Flaxman island, Alaska, and his chronometer rate was obtained by taking the difference of corrections at departure and return.

The observations for longitude, latitude, azimuth, and magnetic variations taken by members of the Canadian Arctic Expedition under the command of V. Stefansson cover a period of more than five years from 1913 to 1918, and are scattered over a region more than 10° wide in latitude and about 50° long in longitude. While it is not claimed that the results of these observations are precise, yet from the great number of observations taken and from the checking of one year with another, there is good ground for the belief that the map produced from these observations and from the results of the different traverses will be by far the most authentic ever published of that part of Canada north of lat. 70° and west of long. 95°.

The bases for the longitude determinations were Winter Harbour on the south coast of Melville Island, Bernard Harbour in the Dolphin and Union Straits, Collinson Point, Alaska, Griffin Point on Prince Patrick Island, Cape Russell on Melville Island, and Armstrong Point on the west shore of Victoria Land. The longitude and latitude of Parry's Rock at Winter Harbour were determined by Parry in 1820 from a great number of observations. The latitude determination was derived from

the mean of 39 meridian altitudes, and the longitude from the mean of 692 sets consisting of 6862 lunar distances. There was a splendid accordance among these several observations, and the resulting longitude is probably accurate. The longitude of Bernard Harbour was determined chronometrically a few years ago by Kenneth Gordon Chipman and John Raffles Cox of the Canadian Geological Survey. It depends on observations made at the 141st meridian, at Bernard Harbour, and again at 141st meridian, as little time as possible being allowed to elapse between the several observations at the 141st meridian and Bernard Harbour.

The longitude of the 141st meridian at the Arctic Ocean depends on the telegraphic longitude of a point on the Yukon River determined by a party in charge of the writer working in conjunction with Dr. Otto Klotz in Vancouver and Mr. Edwin Smith at Fort Egbert, Alaska, and on the projection of the meridian due north from the Yukon River to the shores of the Arctic Ocean. The longitude of Armstrong Point was determined from Bernard Harbour by Mr. Stefansson's first assistant, Storker Storkersen, who made time observations at Armstrong Point in 1916. Mr. George H. Wilkins then carried the chronometer to Bernard Harbour, where it was compared with the ship's chronometer and also rated. The longitude of Griffin's Point was taken from the results of Lieut. Meachem's explorations of the west end of Prince Patrick land when in search of Sir John Franklin in 1853 or 1854. The base for these determinations was Winter Harbour. The position of Cape Russell was also determined by this expedition in search of Sir John Franklin in 1853 and 1854, and the longitude of Collinson Point, Alaska, was determined by Mr. Leffingwell.

A brief summary of the routes followed in the different years will be necessary. In March 1914 the party under the command of Mr. Stefansson left Collinson Point, Alaska, and travelling north-east came on June 25 to Norway Island, near the north end of Banks Island. Here some time was spent in exploratory work in the country near Harkin River, and the expedition in September proceeded south to Cape Kellett. On December 22 a party went east overland to Armstrong Point, but later returned and spent a part of the winter at Cape Kellett. In 1915 the expedition set out from Cape Kellett north along the west coast of Banks Island to Cape Alfred. Leaving Cape Alfred early in April, the party travelled on the ice north-west as far as long. 132° W. and lat. 76° 36′ N., then came east and touched the south-west end of Prince Patrick Island near Griffin's Point in early June, traversed the north-west side of Prince Patrick Island to Cape McClintock, proceeded north-east discovering Borden Island (First Land), and returned south by way of Kellett Strait to Cape James Russell and Bay of Mercy, and thence travelled overland to Cape Kellett, and from Cape Kellett to Armstrong Point on Victoria Land, which was reached in September. Later the party returned to Cape Kellett and

wintered there. The 1916 Expedition left Cape Kellett in the early part of the year, journeying along the west and north sides of Banks Island to Bay of Mercy across McClure Strait to Cape James Ross; along Lidden Gulf, overland to Hecla and Gripper Bay, and along the south-west shore of that bay to Cape Grassy; then north to Borden Island, around the north coast of Borden Island, and east to Isachsen Land; then still further north-east to a new discovery called Meighen Island (Second Land), around the whole coast of this island, and returned south by way of Hassel Sound, King Christian Island and Findlay Island, to another new land called Lougheed Island (Third Land); along the west coast of Lougheed Island and then west to the east coast of Borden Island; thence along the south-east shore and returned to Cape Grassy.

In 1917 the expedition started from Winter Harbour in February and went to Peddie Point in Liddon Gulf. Observations were made at Peddie Point on February 24, and the party went overland to Cape Grassy; then north to the south-east corner of Borden Island, along the east coast of Borden Island to the north-east corner; then north on the ice to lat. 80° 30′. Returning south they visited Isachsen Land and Lougheed Island (Third Land), and returned to Winter Harbour *viâ* the east and south shores of Melville Island. From Winter Harbour the journey was across Melville Sound to Cape John Russell, at the east end of Banks Island; then inland and across country to Cape Kellett. The 1918 ice trip under command of Mr. Storkersen started from Barter Island, Alaska, in March and travelled nearly due north to lat. 72°, where the party camped and drifted on the ice till October 8. They then returned south and arrived at Barter Island in November.

For 1914 the rate of the chronometer was determined from observations made at Collinson Point in March. Between June 25 and July 11 something went radically wrong with the chronometer, but up to June 25 the rate seems fairly uniform. But as far as the location of land is concerned 1914 is not important, as the whole journey was made in fields of ice.

In 1915 two chronometers, 1A and 7A, were used to July 16, but shortly after that date 1A stopped and the later determinations depend on 7A. The first observations in 1915 were taken on April 9, some few days after leaving Cape Alfred. The first observations on land were made June 4 near Griffin's Point on Prince Patrick Island. Just before the trouble developed in the chronometer, observations were made at Cape James Russell on Melville Island. The rate of the chronometer 1A was deduced from the observations near Griffin's Point and from those near Cape James Russell. Chronometers 1A and 7A ran very uniformly during the interval between these two stations. The rate of the chronometer 7A from July 7 to September 15 is deduced from observations at Cape Russell on July 7 and those made at Armstrong Point on September 15. On June 19 a station called Monument Point

on Borden Island and on August 23 Cape Kellett were established for longitude. Those two places are important in that they were used for base points in the subsequent years.

The base points for 1916 longitude were Monument Point on Borden Island and Summer Camp on Lougheed Island. This Summer Camp station was not determined till 1917. The rate of the chronometer was deduced from the observations at Monument Point on May 1 and those at Summer Camp in August.

The base points for 1917 longitude were Peddie Point in Liddon Gulf and Winter Harbour, both on Melville Island, and Cape Kellett on Banks Island. The chronometer rate for February to July was obtained from a comparison of chronometer corrections at Peddie Point February 25 and at Winter Harbour on July 6, and the rate July 6 to August 23 from the corrections at Winter Harbour on July 6 and Cape Kellett on August 23.

The base point for the 1918 ice trip was Barter Island, and the rate of the chronometer was obtained from observations there in March and November.

The time observations were mostly taken either by the method of equal altitudes of the sun, or by a set of altitudes of the sun. A few observations in the very early spring or late fall were taken on the stars. Latitudes are from meridian altitudes of the sun.

In mapping the new discoveries of the expedition and in making any changes in the previous outlines of the coast the astronomical determinations of longitude and latitude were taken as the basis, and the coast-line was mapped from traverses and magnetic bearings. The following are the principal changes :

1. Banks Island is moved in longitude to the westward ; Cape Kellett, Bay of Mercy, and Cape John Russell all show a greater longitude of about twenty minutes than that shown on the Admiralty Chart No. 2118. This change is confirmed by the observations of Messrs. Chipman and Cox at Cape Bathurst and Cape Parry on the north coast of the mainland of Canada. These two points were determined from the 141st meridian by a return chronometer expedition. Also when crossing the ice from Cape Russell at the south-west corner of Banks Island to Bay of Mercy in 1915, bearings were taken from a point about half over, back to Cape Russell, and forward to the west shore of Bay of Mercy. These confirmed the results of the longitude determination on the west shore of the Bay of Mercy. It will be remembered that Cape Russell was one of the points assumed fixed for the 1915 longitudes. Its position as given by McClintock in 1854–55 was assumed correct. A glance at the north coast of Banks Island shows important changes. Just west of Bay of Mercy about 6 miles is a large bay into which a large river empties. This river has its source in a chain of lakes near the south-east side of the island. This is not shown on the old map, but

there is shown on the old map a large bay near Cape McClure, which Mr. Stefansson's party report does not exist. It is very probable that the large bay near Cape McClure is really the one discovered by the Stefansson party, but as the original map of the coast by the McClure party was made some time after the visit and the details were filled in from memory, the bay was mapped out of its true position.

There are considerable changes along the west coast of Banks Island. According to the records of the Canadian Arctic Expedition the form of Burnett Bay is very different from that shown on the Admiralty Chart. It is really the mouth of a large river (Harkin River) which empties into the ocean just behind Bernard Island. Further down the coast will be seen a large bay (Storkersen's Bay) 15 to 20 miles across; this coast-line was mapped from latitude observations, and from traverses and bearings lying to the longitude point at Cape Kellett.

2. Brock and Borden Islands are new discoveries; the only marking on any of the older maps at all close to these islands is Ireland's Eye, a small island or reef; but from the description in Captain McClintock's diary of the island, he cannot be describing Brock or Borden Island. On page 569 of the 'Further Progress in Search of Sir John Franklin,' Captain McClintock in referring to his discoveries in this region says: "None of these islands are more than 60 feet high. They are entirely composed of gravel; saw many small pieces and a few large bunches of grey gneiss upon all of them. Across the centre of the second island of the coast, and on which we built our cairn, the land is scarcely above the sea. Here we saw many masses of blue sea ice far inland, as if the ice was in the habit of making frequent inroads alternately from the east and west." In Mr. Stefansson's diary regarding Brock and Borden Islands, there is a full description of mountains and other topographical features, the most notable of which are the Leffingwell Crags on Borden Island, which rise to about 1500 feet. This altitude of Leffingwell's crags was derived from observations made upon them from Eight Bears Island in Ballantyne Strait. The centre of Brock Island itself has an elevation of 300 or 400 feet, and Borden Island is higher than Brock.

So Ireland's Eye shown on the Chart No. 2118 cannot be either Brock or Borden Island; Mr. Stefansson did not locate any place answering to the location of Ireland's Eye. Heavy fogs which prevail in that region are no doubt responsible for Captain McClintock failing to see Brock and Borden Islands, and perhaps also for the absence among Mr. Stefansson's observations of the small islet called Ireland's Eye. The small islets described by Captain McClintock as reefs and named Polynia Islands were seen by the Stefansson party.

The positions of Brock and Borden Islands were determined from the longitude observations of 1915, from a traverse made by Castel in the spring of 1916, and from longitude observations taken along the east coast of the island 1917. The observations of 1917 afford a splendid

check on the observations of 1915 and on the traverse of 1916, in that the place of observations of 3 April 1917 coincide nearly with the point at the end of Castel's traverse of 1916. The south end of Borden Island from Swenson's Bay south was made by the expedition returning from Lougheed Island (Third Land) in the fall of 1916.

3. Meighen Island (Second Land) and Perley Island along with the several smaller islands are all new discoveries made in 1916. Their positions are determined from longitude and latitude observations along with traverses and magnetic bearings.

4. Hassel Sound, separating Ellef Ringnes Land and Amund Ringnes Land, was found to be much wider than shown on the Chart No. 2118. Ellef Ringnes Land and Amund Ringnes Land were discovered by the Sverdrup Expedition. Captain Isachsen, leaving South-west Cape on Axel Heiber Land, made a journey along the south coast and up the west coast around the end of Isachsen Land and then along the north-east side. The records of this expedition show it was much hampered by fog and storm. This journey was mostly on the ice, only here and there coming to the land, and the Isachsen party did not pass through Hassel Sound, but apparently mapped it from impressions gained from observations from the two ends.

The Stefansson party returning from Meighen Island came to the north-west corner of Amund Ringnes Land. Longitude and latitude observations were taken to the west side of the sound. The plotting of the observations and bearings shows Hassel Sound considerably wider than shown on the Admiralty chart.

5. Findlay Island as shown on Chart No. 2118 is a large island nearly 60 miles long and 40 miles wide lying in a north-westerly and south-easterly direction. Mr. Stefansson found across a large part of the area supposed to be covered by Findlay Island a depth of 160 fathoms of water. There is a small island situated near the place where the north end of Findlay Island was supposed to be. From the southern side of this island (King Christian Island) for a distance of about 40 miles no land was visible until a small island named Paterson came in sight. A group of islands four in number came into view and have been called Paterson, Grosvenor, Edmund Walker, and Lougheed. The name Findlay Islands has been given to the whole group. At least some of these islands were seen by Lieut. Sherrard Osborne in May 1853 when he made his journey along the north shore of Bathurst Island. The several islands lie close together, and are almost in a north-westerly direction with respect to one another. Lieut. Osborne's discovery of what he called Paterson Island is described in page 200 of 'Further Progress relative to the Recent Arctic Expedition in Search of Sir John Franklin.' These islands—Paterson, Grosvenor, Edmund Walker, and Lougheed—were mapped from observations, traverses, and bearings made by Stefansson's party. The heights of these islands above the sea are approximately as

follows: Paterson greater than 300 feet, Grosvenor 150 feet, Edmund Walker greater than 600 and perhaps 800 feet, Lougheed Island less than 500 feet.

Lieut. Osborne recorded only two of these islands, and as he was viewing them from the south-east and from a distance of probably 20 miles, the only ones he would distinguish were Paterson and Edmund Walker; Paterson because of its height and also nearer would be more easily seen, and Edmund Walker with its height of 600 feet would be the most prominent of the group and would completely cut out Lieut. Osborne's view of Lougheed Island. These four islands were mapped from longitude and latitude observations in 1916, from traverses, and from bearings of the prominent points. Summer Camp on Lougheed Island, whose longitude was determined in 1917, was important in that it was a base for the longitudes of 1916, when more than a month was spent in explorations of this district.

6. The north coast of Victoria Land from Glenelg Bay east was mapped from observations made by Mr. Storker Storkersen, Mr. Stefansson's first assistant. There were no longitude observations, but latitude observations were taken frequently, and a detailed traverse of the whole coast from Glenelg Bay east to beyond Cape Ogilvie was made. Point Peel was located by bearings from Cape John Russell. Hansen's explorations made in 1905 are also shown, and there is every likelihood of Storkersen's work when continued checking into Hansen's farthest in 1905. Unfortunately, the lateness of the season and the determination of Storkersen's men to return to Armstrong Point forced him to abandon the work when nearly in sight of the goal.

The foregoing has been written to explain as well as possible any changes that may have been made in the existing coast-line and to show the methods that were employed. The Canadian Arctic Expedition kept its diaries with the greatest care. The observations were regularly taken, and while perhaps there were irregularities in the rates of the chronometers, yet the average as taken over long periods of time should give results not far from the truth.

The following table gives the determinations of geographical position which form the basis of the corrections to the map (shown in red on the map published in the *Geographical Journal*, October 1921):—

GEOGRAPHICAL POSITIONS, 1915–16–17.

Date. 1915	*Locality.*	*Longitude West.* ° ′ ″	*Latitude North.* ° ′ ″
June 4	S.W. corner Prince Patrick Island ...	123 45 00	76 10 34
,, 13	Island, Satellite Bay	117 52 00	77 27 02
,, 19	S.W. corner Brock Island	115 16 05	77 48 17
,, 24	Eight Bears Island	114 32 15	77 43 19
July 7	Cape Russell	117 28 00	75 11 41
,, 19	West side Bay of Mercy	118 49 42	74 08 19
Aug. 24	Cape Kellett	124 55 06	71 59 02

Date.	*Locality.*	*Longitude West.*	*Latitude North.*
1916		° ′ ″	° ′ ″
June 3	North end Isachsen Land	105 28 45	79 23 09
„ 15	S.W. corner Meighen Island	99 58 20	79 53 37
„ 21	N.E. corner Meighen Island	98 54 26	80 06 50
July 3	Near N.E. corner Amund Ringnes Land	98 17 23	78 43 53
„ 26	South point King Christian Land ...	102 30 16	77 39 02
Aug. 24–31	South end Lougheed Island	104 45 27	77 06 38
Sept.	Armstrong Point	117 39 56	72 48 25
1917			
Mar. 22–25	Cape Grassy	113 01 10	76 14 46
April 1	Cape Norman	110 10 09	77 26 00
„ 3	N.E. corner Borden Island	108 51 00	78 25 32
May 13–27	Deer Bay Isachsen Land	104 47 20	78 50 12
June 7	West coast Lougheed Island	105 04 33	77 22 28
„ 28–July 4	Deely Island	108 46 25	74 56 52
July 6	Winter Harbour	110 47 13	74 46 14
„ 27	Point John Russell	115 10 58	73 28 41

The magnetic variation was observed at 26 points, and the results are given below.

[*Note added by the Editor G.J.*—They have been compared with the variations shown for 1922 on the small North Polar Chart given on Admiralty Chart 2598, the *Curves of Equal Magnetic Variation*, 1922, compiled at the Royal Observatory, Greenwich, and published 25 March 1922. This diagram is on a small scale, and the curves are plotted at intervals of 15°. The interpolation is necessarily rough, and cannot be relied upon to within one or two degrees. The figures in the last column Observed *minus* Chart show values consistently negative over the region Melville Island, Prince Patrick Island, and "First Land" (Borden Island), and positive to the north-east over the region of Ellef Rignes Island and "Second Land" (Meighen Island). The interval of about six years between the date of observation and of the chart, and want of knowledge of the data from which the chart was compiled, make it impossible to pursue the comparison at the moment. The results have been forwarded to the Royal Observatory.]

MAGNETIC VARIATIONS, 1915–16–17.

Date.	*Longitude West.*	*Latitude North.*	*Variation East.* *Observed.*	*Chart* 1922.	*O–C.*
1915	° ′	° ′	° ′	°	°
June 4	123 45	76 10	77 35	102	−24
„ 13	117 52	77 27	94 55	122	−27
„ 17	116 20	77 40	110 00	132	−22
„ 19	115 16	77 48	117 49	130	−12
„ 20	114 32	77 43	117 35	130	−12
„ 25	114 20	76 57	106 01	133	−27
July 19	118 18	74 08	91 31	98	− 6
1916					
May 17	113 25	78 33	119 12	142	−23
June 13	100 34	79 48	196 15	180	+16
„ 15	99 58	79 54	195 36	180	+16
„ 20	98 54	80 07	204 30	185	+20
July 2	98 01	78 50	206 04	185	+21
„ 19	98 51	78 03	201 13	182	+19
„ 27	102 30	77 35	180 15	168	+12
Aug. 4	102 54	77 11	169 13	164	+ 5
Sept. 10	106 00	77 35	150 56	162	−11

Date.	Longitude West.	Latitude North.	Variation East. Observed.	Chart 1922.	O–C.
	° ′	° ′	° ′	°	°
Sept. 16 ...	... 110 00	77 38	130 56	147	−16
,, 18 ...	... 112 00	77 35	123 40	140	−16
,, 19 ...	... 113 30	77 35	120 57	137	−16
1917					
Mar. 24 ...	... 113 01	76 15	102 44	130	−27
Apr. 6 ...	... 109 02	78 25	144 51	153	− 8
,, 11 ...	... 108 51	78 53	149 52	156	− 6
,, 21 ...	... 109 13	80 05	154 53	160	− 5
June 17 ...	... 105 37	76 10	137 34	157	−19
July 17 ...	... 112 50	74 06	84 32	111	−26
,, 18 ...	... 112 49	73 56	73 58	108	−34

REVIEWS

EUROPE

The Races of England and Wales.— **H. J. Fleure.** London: Benn Bros. 1923. *Illustrations.* 5*s. net.*

THIS little book shows how little is known definitely and clearly regarding the prehistoric origins of the people of the British Isles. It might be described as a series of suggestions as opposed to conclusions, for the author, while indicating many possible different sources from which the population has been recruited, is careful not to commit himself dogmatically to particular views. However, in giving a brief account of the results of recent research he indicates how they may possibly explain the distribution of certain racial characterizations, especially in South Britain.

Although the reader on finishing the book may experience disappointment on finding how little certain knowledge he has gathered, he will no doubt have his interest aroused, and a desire for further information stimulated. And apparently it is in this direction that the author looks for the reward of his efforts. The fairness of his presentation of the facts, the unbiassed point of view he takes up are very commendable, and some of his reflections are particularly *à propos* at the present time, as for example when he points out that a modern racial type is a *terminus ad quem* rather than an *origo a qua*. The Mediterranean race, for instance, is the *terminus ad quem*, *i.e.* the goal of a long-continued process of descent with modification in an area of characterization, rather than a type of untold antiquity and persistence. The author would no doubt have made his subject more easily followed and his points more readily grasped had he broken up his work into chapters, or at least sections, instead of making it one long continuous exposition. E. A. P.

Old London Illustrated. A series of drawings by the late **H. W. Brewer**, illustrating London in the sixteenth century, with descriptive notes by **H. A. Cox.** 3rd ed. London: 'The Builder.' 1922. Pp. 58. *With 14 plates.* 7*s.* 6*d. net.*

A perusal of this extremely fascinating book brings home to one how modern a city London actually is. Two events contributed chiefly to the destruction of the old city. The Dissolution of the Monasteries by Henry VIII. was responsible for the disappearance of almost every trace of the nineteen great foundations, and the many smaller ones which existed previously. We are told, for instance, that the Priory of Holy Trinity, Aldgate, was pulled down by Sir Thomas Audley, and the materials sold at sixpence a cartload. The second

catastrophe was, of course, the Great Fire in the next century. Of the 107 parish churches within the city, 86 were destroyed by it. Mr. Brewer therefore selected the first half of the sixteenth century for his exercises in the re-construction of old London views. His panorama of London from the east shows the city huddled within the city walls, around Old St. Paul's, with the Tower dominating the scene in the foreground. The importance of the Thames as a highway, or almost as *the* highway, is well brought out by this drawing. A dozen plates follow, of which the most interesting are, perhaps, the reconstructions of Old St. Paul's, Old London Bridge, and St. Stephen's, Westminster. The notes are adequate; but some indication of the authorities on which both they and the drawings were based might have been included.

The English Countryside Series. London: R. Scott. Various years:—**The Heart of the West.— A. L. Salmon.** 8*s.* 6*d. net.* **Wanderings in Wessex.— E. Holmes.** 8*s.* 6*d. net.* **An Old Gate of England.— A. G. Bradley.** 8*s.* 6*d. net.* **England's Outpost.— A. G. Bradley.** 10*s.* 6*d. net.* **Byways in Berkshire and the Cotswolds.— Rev. P. H. Ditchfield.** 8*s.* 6*d. net.* **Seaward Sussex.— E. Holmes.** 7*s. net.*

These six volumes in the "English Countryside" Series form a fairly complete survey of Southern England. Handy in size, containing numerous illustrations and plans, with a map of the region covered by each—a feature which might have been better executed—and written by enthusiasts, they should prove welcome companions to visitors. Not that they are to be classed as guide-books pure and simple; the general aim is to give a presentment of the countryside in a series of pictures, rather than a detailed description of the whole. Throughout, the historical background has received considerable emphasis, somewhat to the exclusion of other aspects. Yet this is hardly to be regretted. In these pages one can obtain a true insight into the successive scenes of English history, the real history of English homes, each in its proper setting. With one or other of these books as companion, one may set out with the swaggering crews of Cinque-portsmen for the great Yarmouth herring fair, or play a dignified part in a royal coronation; participate in the merry-making that attended upon the "scouring of the White Horse," or, if in more chastened mood, stand silently puzzling over the riddle of Stonehenge, to return from all with a lively realization of the extent to which the past has left its stamp upon the English countryside.

Dublin of the Future.— Patrick Abercrombie, M.A., A.R.I.B.A., Sydney Kelly, F.S.I., and **Arthur Kelly.** Liverpool: University Press; and London: Hodder & Stoughton. 1922. Large 4to, pp. 58. *Maps, Plans, and Illustrations.* 21*s. net.*

This fine and well-illustrated publication, by the Civics Institute of Ireland, describes a Scheme which obtained the first prize in an International Competition, promoted by the Institute in 1914. In view of recent events the Institute considers that the Scheme should now be made public, with the hope that, as Ireland enters upon a new era, means may be found for translating its proposals into actual fact.

The Promoters point out that the Scheme, far-reaching as it undoubtedly is, does not demand immediate expenditure on a lavish scale. They aim at the improvement of their Capital on a sound and well-reasoned plan, to which improvements made from time to time shall conform, so that the ultimate result shall be one of which the whole country can be proud.

Dublin is a city of contrasts, more obvious, perhaps, than those prevalent

in many cities of importance. Exceptionally fine buildings, mostly of the late eighteenth century, are found in most unsuitable surroundings, and are only reached by tortuous streets and narrow lanes, while vistas, except perhaps along the quays, are almost unknown. Slum areas predominate, and have swallowed up many stately residential homes and terrace houses, now let as tenements. The aim must therefore be to abolish slums by giving the inhabitants seemly and well-spaced dwellings, and so to contrive the streets as to provide conveniently for an increasing traffic, due regard being paid throughout to what will please the eye.

Between pages 10 and 11 will be found two incisive plans, one of Dublin as it is, and another of Dublin as the authors would strive to make it. The latter, elaborated later on, shows in simple orange colour the new streets and open spaces imposed upon the existing city (printed in black), so that it is easy to observe the general effect and to gather information as to the result in detail. The reader can have no doubt as to the improvement. The existing markets, north-east of the Four Courts, are taken as a centre, and a large central area is formed, containing public buildings and a central Tube station, and from this area radial streets proceed, so as to form, with new and old circumferential streets, an irregular polygon, corresponding roughly in shape to the space enclosed by the Circular Road.

All the new streets absorb and utilize, more or less, some existing streets, while their arrangement enormously facilitates the means of communication. Sackville Street, now O'Connell Street, east of the central area, retains its pride of place, but falls into the network as one of the external circumferential lines, with branches, as at present, connecting O'Connell Bridge with Grafton Street and Great Brunswick Street. Dame Street leads thence to Christchurch, whence (east and west of the Cathedral) two new streets cross the Liffey to the central area. North of the river, on the east, a fine area is formed round the Custom House, with a bridge to the south, the railway being taken under the river. On the west a fine "processional road" leads straight from the central area to Phœnix Park. South-west, a broad new road leads from Christchurch, striking the Circular Road at Dolphin's Barn. A new road, running east and west, connects this "radial" with St. Stephen's Green.

This brief description refers only to the principal street improvements proposed, but in other directions, such as parks, railway connections, housing, docks, etc., the needs of the city are dealt with fully and most suggestively, with numerous illustrations, in black and in colour. R. L. C.

Scandinavian Relations with Ireland during the Viking Period.— A. Walsh. Dublin: Talbot Press. 1922. *3s. 6d. net.*

The effects of the Viking inroads in stimulating internal and inaugurating external trade are more clearly shown in the case of Ireland than in that of England, since the former had escaped the stimulus of Roman occupation. The result is to be seen in the concentration of trade at points accessible to the Scandinavian ships, in preference to the small local fairs scattered over the country. As Mr. Walsh shows, it was to this development that the virtual foundation of Dublin, Limerick, and Waterford was due. In this way, Ireland was brought into touch with European commerce over a wide area, extending from Iceland to France, and even to Russia and the East. Mr. Walsh has been compelled, by the limits of a thesis, to treat his subject rather briefly, but his work is of considerable interest, and justice has not been done here to his chapters on literary and allied subjects.

Le Port de Marseille.— J. Léotard. Paris: Dunod. 1922. 12 *frs.*

To study M. Léotard's work is to realize that the choice of Marseilles as the site for the recent French "Exposition Coloniale" was practically inevitable. Though he dwells with pride upon the long history of his city, and especially upon its record of civic independence during the Middle Ages and at the outset of the Revolutionary period, it is not until the nineteenth century that his task really commences, and the true significance of the port of Marseilles is revealed. A considerable factor in its rise to prosperity has been its position on the natural route connecting northern and central France with the shores of the Mediterranean. Until the nineteenth century, it shared in the fortunes of the other Mediterranean ports, but with the French occupation of Algiers in 1830, a new era opened. As French influence spread over Algeria and Tunis, so the volume of trade with France increased, and in this trade Marseilles played an ever-growing part. Added to this was the impetus given by the opening of the Suez Canal, especially in connection with the development of the overland route. This increase had led in 1853 to the first step in that dock expansion which has gone on steadily since. Between 1860 and 1913 the combined annual export and import trade increased fourfold in value, and during approximately the same period the population doubled. To-day, Marseilles' share in French colonial trade is over one-half the total figure for the whole country. As regards the present position, trade by the year 1920 had not regained its pre-war level. Among the projects for future development noted is the construction of a canal linking up Marseilles with Arles and the Rhône. This is, briefly, the story M. Léotard has to tell, and he has produced a well-written account, the only ground of criticism being his handling of the statistics, which are rather overwhelming at first sight.

The Blue Guides: Switzerland, with Chamonix and the Italian Lakes.— Edited by Findlay Muirhead. London: Macmillan & Co.; Paris: Hachette & Cie. 78 *Maps and Plans.* 15*s. net.*

After the protracted interval of the Great War and the many changes consequent on it an up-to-date handbook to Switzerland was obviously needed. For British patriotism, or prejudice, was disinclined to carry about 'Bædeker,' however well he might meet the needs and interests of the average tourist; and of Mr. Coolidge's edition of 'Murray,' in all matters not subject to change as perfect a companion as the educated traveller or climber can desire, there seems no prospect of a revision. But the existence of these volumes—as well as of the Alpine Club edition of Ball's 'Central Alps'—made the task of bringing out a new and original work one of some difficulty and delicacy. We are glad to be able to congratulate Mr. Muirhead on having carried it through with enormous industry, great intelligence, and, on the whole, marked success.

The first matter the editor of 'The Blue Guide' had to consider was whether he would construct a book or a catalogue; a volume rich in various information and suggestions and descriptions such as may be studied with pleasure at home or in one's inn, or an annotated catalogue fit for the pocket and for reference on the road. He has attempted a compromise, a combination of the two. Doubtless in this decision he was mainly influenced by considerations of bulk and weight. His 'Guide' takes less room than 'Murray' and weighs some four ounces less—and in a pedestrian's pocket or luggage every ounce counts. But, within his limits, Mr. Muirhead has striven to be both comprehensive and terse. He has done his best to meet the practical needs not only of the summer tourist but also of the winter-sportsman and motorist. He has been diligent

in his endeavour to give wanderers from beaten tracks needful directions and to point out objects of interest to travellers of historical or artistic inclinations. His first pages are occupied by an excellent sketch of the History of Switzerland, by M. Martin, Professor of Literature in the University of Geneva, which is followed by an essay on Swiss Art, by M. Baud Bovy, late Director of the Musée des Beaux Arts in the same city. We find throughout the volume places and objects of historical interest and notable works of art both ancient and modern systematically indicated.

Admirable as Mr. Muirhead's work appears to us as a whole, there are several points of detail in which it is open to criticism. The pages are, we think, needlessly crowded with local names and figures. To index every peak and pass is surely superfluous. It would be better to indicate and describe more fully the popular expeditions, leaving mountaineers to refer for the rest to their Climbers' Guides. It is more important to them to be told what to choose than how much there may be to choose from. Again, the number of beds in each inn and of inhabitants in each hamlet may be held superfluous statistics, while inn tariffs are still too unstable for any figures to be likely to be of permanent value.

The volume is amply supplied with town-plans and district maps of varying scale. The latter, though as a rule clear, have two defects: the method employed to show relief by side lighting of the hills obscures in the lighted parts the details and outlines of the glaciers. Cantonal and other political frontiers are shown by red lines which are easily confused with those indicating routes. These are small blemishes in a work which is a model of compactness, correctness, and thoroughness. D. W. F.

The Birth of Jugo-Slavia.— H. Baerlein. 2 vols. Parsons. 1922. 42*s. net.*
A Difficult Frontier.— H. Baerlein. Parsons. 1922. 6*s. net.*
The Balkan Peninsula and the Near East: a history from the earliest times to the present day.— F. Schevill. G. Bell & Son. 1922. 20*s. net.*
Some Aspects of Boundary Settlement at the Peace Conference.— A. G. Ogilvie. S.P.C.K. 1922. 6*d. net.*

At the best of times, the delimitation of frontiers is a task of great difficulty. Where, as in the Balkans, conflicting elements, ethnographical, economic, military, political, and international, have to be reconciled as far as may be, it becomes almost impossible to produce an entirely satisfactory result. Mr. Ogilvie sets forth very clearly the difficulties confronting the treaty-makers on this head, and indicates the reasons for the final decisions. Mr. Baerlein's object is to set forth and justify the claims of one party to these transactions, that is, Yugo-Slavia. His 'Birth of Jugo-Slavia' is inspired throughout by a warm regard for the peoples comprised in the present Yugo-Slav state, and by aspirations for the future of the Balkan peninsula. The first leads him to look to the prosperous development of that state, the second, to its ultimate union with Bulgaria. In tracing the outlines of Serbian history, therefore, he endeavours to show the essential unity of these two peoples, and the historical causes which have kept them apart. But for the rivalry of the Great Powers, the nineteenth century might have witnessed this union; through the suppression of the Russian scheme for a "Big Bulgaria" by the Congress of Berlin, it remains an ideal for the future. The greater part of the book deals, naturally, with the Great War and subsequent events. Here the author's concern is to combat Italian policy in the Eastern Adriatic. The problem of the Italian–Yugo-Slav frontier

dates from the Pact of London, 1915, and the wide field there given for Italian expansion. In the author's opinion, even the compromise reached in 1920 may prove disastrous in the future, as it included 600,000 Slavs within Italy's frontiers. Mr. Baerlein's other book, 'A Difficult Frontier,' deals on similar lines with the Albanian question. Here, again, he would rectify the frontier in favour of Yugo-Slavia, a step, he believes, which would find favour with many of the Albanian frontier tribes themselves.

Mr. Schevill has written a careful and impartial history of the Balkan peninsula. In his later chapters, which cover the ground of much of Mr. Baerlein's work, he is not so hopeful as to Yugo-Slavia's future, fearing the questions, domestic and external, which must arise over its composition.

ASIA

Voyage du Marchand Arabe Sulayman en Inde et en Chine rédigé en 851.—G. Ferrand. Paris: Editions Bossard (Les Classiques de l'Orient). 1922. Pp. 155. 21 *frs.* (unbound).

The history of this work, the unique manuscript of which was first discovered and translated by Renaudot in 1718, is too well known to need repetition. Reinaud's issue of Langlès' text in 1845, together with a translation entitled 'Relation des voyages faits par les Arabes, etc.,' definitely established its position as a classic of historical geography. Further study of the early Arabic geographers has given it increased importance as the source, either directly or indirectly, of much of their information on the Indian Ocean and the Far East. M. Ferrand (who has already given extracts from it in the first volume of his 'Relations de voyages etc. relatifs à l'Extrême-Orient') deserves the gratitude of all students of historical geography by this reissue of the complete work in a revised translation with the geographical data carefully corrected. The non-technical reader also will find it a book full of charm and interest. A word of appreciation is due to the designer of the woodcuts which add so much to the attractive appearance of the book.

The work is in two parts, for the first of which M. Ferrand retains the traditional title. Its ascription to a certain Sulaymān whose name appears once in the text (p. 38) is, however, misleading and untenable. Internal evidence bears out Sir Henry Yule's view that it is a compilation of mariners' notes and tales, put together without any attempt at orderly arrangement by an unknown author under the title of 'The Chain of Histories.' The second, written by a certain Abū Zayd (one of Mas'ūdī's authorities), probably somewhat earlier than the date (916) assigned by M. Ferrand, is a separate work filling out the former and explaining the decline of the seaborne trade. The lean and striking style of the original is entirely lost in the elaborate translation, which at times reads more into the text than is perhaps justifiable. Actual mistranslations also are more frequent than they should be in a work now in its third revision. Some of these have been discussed by Prof. Pelliot in 'T'oung Pao' (December 1922). Of the others space permits the mention here only of one or two of the most important. On p. 48, the land of Konkan is, according to the text, not contiguous to the kingdom of Ballahrā, but identical with it. The strange statement on p. 50 that the fullers accompanying the army of Rahmā number from ten to fifteen thousand should surely read that (according to another account) this figure represents the utmost strength of his army. And why, on p. 66, should the innocent delight of the Chinese in games and toys be perverted into habits of debauchery? H. A. R. G.

AFRICA

Among Pigmies and Gorillas: with the Swedish Zoological Expedition to Central Africa, 1921.— Prince William of Sweden. London: Gyldendal. 1923. 25*s. net.*

Lured by the spirit of adventure which characterizes the Scandinavian, Prince William of Sweden was led to follow the footsteps of many of his compatriots into the Congo forests. In the recently published translation of his book 'Among Pigmies and Gorillas' he gives us a personal account of his experiences in the regions of the Eastern Congo—Kivu, Lake Edward, the Semliki, Ruwenzori—and an insight into the work of the Swedish Zoological Expedition, which he commanded.

Coming in from the east through Kenya Colony and Uganda and across Lake Victoria, the expedition, composed of—beside Prince William—Count Nils Gyldenstolpe of the Riksmuseum in Stockholm; Mr. Oscar Olsson, a cinematographer; an English taxidermist, Mr. Allen Ruddle; and another Englishman, Mr. Carr, in charge of the transport, etc., began its work of collecting, from east to west, along the three groups of volcanoes known as the Birunga Range on the triple boundary between Uganda, Ruanda, and the Belgian Congo. Afterwards, going northward on the Congo side by way of Lake Edward and the Semliki, the Ituri forests were reached, and then, Prince William having contracted Spirillum fever which laid him up for three months and curtailed the itinerary, the party turned at Irumu, proceeding home by way of Lake Albert and the Nile.

To the reading public in Sweden this work and the wonderful region it describes will doubtless be of the greatest interest, but no great amount of new information is to be gained from it by English readers. It reaches us rather late in the day, so to speak. On the other hand, and saving the book from mediocrity, the author has a certain charm of style that shows up even through the translation, which, it may be remarked, is not of the best in many places. To do him justice, Prince William is evidently in love with the wild life, and at times the adventurous spirit within him clamours to be heard. So we read: "No artificial life, however highly developed it may be, can ever compete with Nature herself and the life to which she calls us." Again, and perfectly true; "Idleness and inactivity resolve themselves in the tropics, more quickly than anywhere else, into decay." True also are the lines, "it is not the big animals you need be afraid of, but the small ones" (*e.g.* tse-tses, ticks, and mosquitoes).

The Prince and the other members of the party took their toll from the game herds which they encountered and also from the Lake Edward lions. The Kivu gorillas came in for more than ordinary attention, even for a zoological expedition, as fourteen of these harmless and rare animals were killed, many more than might be deemed necessary for scientific study.

There are only ten chapters in the book, two of which (the sixth and ninth) are written in a disjointed style by Count Gyldenstolpe. The best chapters are the fourth and fifth—"To the Heart of Africa" (in this case Kivu and the volcanoes) and "In the Animals' Paradise" (the Ruindi plains south of Lake Edward). As the book is a narrative of a zoological expedition, one is disappointed to find the interesting fauna of the eastern Congo not dealt with at greater length. After all, it is from the animals of these countries that we gain the most entertainment.

Many of the photographs, of which there are eighty-two, are interesting, especially those of wild animals by Mr. Oscar Olsson, but they are not so well

reproduced as one would expect from the high price of the book. There are numerous errors both in the spelling and designation of places and things, such as "Sembiliki" for Semliki; "Kwijwij" for Kwidgwi; "Bogandana" for Bobandana; "Butshuru" for Rutshuru; "Vissiko" for Visoke; but for these the translator appears to be in great measure responsible. Two maps are provided, and there is an adequate index. T. A. B.

AMERICA

La Californie et les Grands Déserts Americains; Notes et Études.— P. L. Monet. Paris: Librairie Générale de l'Enseignement. 1922. Pp. 246. *Illustrations.* 12 *frs.*

A number of studies and notes, some of considerable extent and all marked by care and precision, from the botanical journeys of the author in the western United States. This promising young botanist fell in the war, and the papers have been collected from his note-books and edited by his father. While the standpoint is mainly botanical, there are some valuable chapters on the soil and vegetation of Nevada, the Death Valley and North-East California; a study of the red-wood forests is of much interest, and like all the articles is admirably illustrated. This young Frenchman, who was only twenty-two years of age, was clearly a botanist of great promise: the work he has published is of notable merit.

AUSTRALASIA AND PACIFIC ISLANDS

A Woman's Impressions of German New Guinea.— Lilian Overell. London: John Lane. 1923. Pp. x. + 223. *Illustrations.* 12*s.* 6*d. net.*

Patrolling in Papua.— W. R. Humphries, A.R.M. With an Introduction by **J. H. P. Murray,** Lieutenant-Governor and Chief Judicial Officer of Papua. London: T. Fisher Unwin. 1923. Pp. 287. *Illustrations and Map.* 21*s. net.*

These two volumes offer a strange contrast. The first is a superficial record, in places carelessly written, of impressions and experiences gained during a brief stay in the country, while the second is an inspiring narrative of travel by one who has intimate knowledge of patrol work in Papua.

Miss Overell does not pretend to be anything more than a passer-by, and she writes, moreover, of conditions in 1920, when the fate of the German settlers was still uncertain. In May 1921 the mandate was definitely given to Australia, and the Federal Government sent a special tribunal to try cases of the "German nationals." In the following year a final decision allowed the half-caste Samoan women who had married Germans to remain, together with their husbands, on their plantations. Miss Overell stayed some time with one of these women, the daughter of an American consul at Apia and a Samoan of high birth, and gives an interesting account of her activities and dominating personality.

Miss Overell says that, in spite of the efforts of one enlightened governor, "the German policy with regard to natives was severe, and in the early days cruel floggings were common; . . . even to-day one can see quite plainly how deeply the fear of the German has bitten into the native mind." The natives, we are told, may have many bad points, but they are generous, anxious to please, patient and uncomplaining, "and their fate lies in our hands."

One cannot but feel that if their fate lies in the hands of men like Mr. W. R. Humphries they are fortunate indeed. Mr. Humphries is of the stuff of which the ideal outstation officer in a tropical land is made. Almost every

page of his book, which is written modestly and straightforwardly, shows his insight into native character and his tact and sympathy in dealing with the primitive people he has come to rule.

He is, however, more than a capable administrative officer: he is a great traveller. His first chapters deal with his attempts to establish an overland route between his station Nepa in the Gulf Division, near the border of Papua and what was formerly German territory, and Kerema on the shores of the Gulf of Papua. The first attempt was brought to a stop by an expanse of impenetrable swamps, but the second was successful. He then undertook a more important and far more formidable journey from Kerema, *viâ* Nepa, across the hitherto untraversed ranges which divide Papua and New Guinea, and came down to Morobe in Gulf Huon, thus achieving the crossing of the island from coast to coast. This in itself, by reason of the difficulties of the country and the hostile attitude of some of the tribes, made the journey remarkable enough, but even more remarkable was the manner in which Mr. Humphries accomplished it. He took with him only seven native police and seventeen carriers, all of the latter being prisoners who were undergoing sentence for murder and cannibalism. The difficulties, hardships, and dangers of that march are related with restraint and with many a delightful touch of humour: the crossing of the wide Oreba river with the help of a wire rope; the cutting through the dense undergrowth to make a passage; the scourges of mosquitoes and leeches; the finding of a native track which led the party up to the mountain regions of moss and cold on to "the roof of Papua"; the bitter nights in caves; the anxiety lest carriers should desert and the spirits of the police become daunted; the descent from 12,000 feet to the open plains; the meeting with the people of the Kwolun Valley who had never seen a white man before, yet yielded to friendly advances; the hostile reception by the men of the Waria mountains, where the situation was saved first by Mr. Humphries marching straight ahead and holding his fire in the face of great provocation, and then by the intervention of two "saltwater men" from the coast dressed in knickerbockers and singlets; and the final arrival at Morobi without a casualty.

'Patrolling in Papua' should be an inspiration to every young officer in the tropics and a delight to all admirers of the work of the "outside men" to whom it is so fittingly dedicated. The photographs, as in Miss Overell's book, are excellent, but equal praise can hardly be given to the map, which, having been much reduced, suffers accordingly. A map on a larger scale showing the author's route in more detail would have been valuable. There is no map at all in Miss Overell's book. O. R.

MATHEMATICAL GEOGRAPHY

Climatic Changes, their Nature and Causes.— **Ellsworth Huntington** and **Stephen Sargent Vischer.** New Haven: Yale University Press. London: Humphrey Milford; Oxford University Press. 1922. 8vo. Pp. xviii. + 329. *17s. 6d.*

In this book the authors have adventured into very speculative cosmical physics, and we must preface the review by a warning that in our opinion the foundations are inadequate, where they are not fantastic. But with this warning, we will for the moment adopt the authors' point of view, and summarize the problem and its solution as they see it.

When it became evident that the Earth had passed through many cycles of climatic change, one of the earliest explanations suggested was that the heat radiated by the sun had varied from time to time. This could not be denied,

but equally, for a long time there was no evidence in support, and with this book Huntington and Vischer have made an attempt to build up a first plausible and detailed theory of the solar control of geological climates.

The basis of the new theory is the supposed meteorological paradox that as the sun becomes hotter the Earth becomes colder. Astrophysical work has shown that in general the sun radiates more heat when sunspots are numerous than when they are few. On the other hand, in the eleven-year sunspot cycle, the temperature in nearly all parts of the Earth's surface is highest at sunspot minimum and lowest at sunspot maximum, the range being about one degree (Fahrenheit) in the tropics and decreasing towards the poles. Other changes occur as well; of special importance is the feature that at sunspot maximum cyclonic storms are most frequent, while those of temperate latitudes tend to follow tracks which are displaced towards the equator. At sunspot minimum there are relatively few storms, and these on the polar sides of the normal tracks. Hence when sunspots are numerous the "temperate" countries, such as western Europe and the northern United States, are colder and snowier than when they are few.

Chinese records of sunspots show an absolute maximum about 1372, and the authors assume that this was the cause of the cold and stormy period in the first half of the fourteenth century. They therefore carry the argument further, and suppose that in the geological past there have been still greater maxima of sunspots, which caused colder and stormier periods than any of which we have records in historical times. These could not produce glacial periods unless other conditions were favourable, but after a period of great mountain building, when the continents were highly emergent, a rapid increase in sunspots resulted in a Great Ice Age. The terrestrial conditions change more slowly than the solar, hence the phenomena of interglacial periods. In a later chapter arguments are adduced which suggest that the sunspots, owing to their effect on storminess, may themselves play a part in the crustal changes, the rapid fluctuations of barometric pressure acting like the blows of a hammer in fissuring the crust and causing earthquakes.

The solar hypothesis of climatic change is faced by the crucial test on which so many glacial theories founder, namely the Permo-Carboniferous glaciation, which was almost entirely confined to low latitudes. The supposition is that at this period sunspots rapidly reached an extraordinary intensity, perhaps the greatest in all time. The Earth became much colder, storms were very frequent, but the storm tracks were concentrated in tropical and subtropical regions. Here glaciation developed with great intensity, but nearer the poles the snowfall was too light, and all the temperate regions were occupied by arid tundras like those of Siberia. Conversely, the long periods of mild climate extending nearly to the pole were associated with an absence of solar disturbance; they are in fact the normal condition. This brings us to the most amazing chapter in the book. Sunspots are attributed to electro-magnetic disturbances transmitted from the nearest "fixed" stars, especially the double and triple stars, and from the known motions of a number of these stars the amount of solar disturbance is calculated for the period from 70,000 years ago to 70,000 years hence. The resulting curve rises sharply from a deep minimum about 70,000 B.C. to a maximum at 30,000 B.C., followed by a less rapid fall to the present day. These dates agree closely with the latest chronologies of the Quaternary Ice Age, and to that extent support the theory, but the chapter presents many difficulties, and can hardly be accepted in its present form.

The ramifications of the subject are followed in close detail, and this makes the book of considerable interest. It will be widely read, and no doubt the authors will have to meet a storm of criticism. Even the fundamental idea can be questioned, for recent work has shown that the relation of sunspots to solar radiation is not so simple as is supposed. It appears that the maximum radiation is reached with relative sunspot numbers between 100 and 160; above this it falls off again, and if the relationship should hold for higher numbers, the solar radiation would be the same for a sunspot number of about 350 as for no sunspots, and the whole argument becomes invalid. The difficulty may not be insuperable, because the radiation would be distributed over different wave-lengths, but it has to be borne in mind. Yet the book is so lucidly and confidently written that to some readers these difficulties may appear of small account.

Nevertheless we think that the theory as a whole would not be accepted or a moment by any solar physicist. While there is something to be said for the theory of the inverse relation between sunspottedness and earth temperatures, there is a solid impediment to believing that the solar variation is controlled by the "nearest fixed stars." How can they be responsible for the eleven-year cycle? And if they do not control the large variation we do see, why make them responsible for a larger variation we are asked to believe in without other reason than the convenience of the argument?

HISTORICAL GEOGRAPHY

Mark Sykes: His Life and Letters.— **Shane Leslie,** with an Introduction by the **Rt. Hon. Winston Churchill.** Cassell & Co. 1923. 16*s. net.*

Sir Mark Sykes, the most entertaining of men, was not a geographer, but he was an amateur of geography as of many other interests. The present writer remembers an interview with him when, newly home in 1903 from his second excursion into western Asia, he wished to address the Royal Geographical Society. He stated with engaging frankness that he had no geography to impart to our evening meeting, adding that of course he would not impart it if he had, for what was the use? "I'll keep them laughing for two hours," he said; and without a doubt, so could he. But this evening meeting never came off. It would have brightened strangely the old theatre of the Board of Works, if one may judge by the book 'Dar-ul-Islam' which narrated the experiences of that journey with the touch of a born caricaturist.

To that book and to two others, of which one is 'The Caliph's Last Heritage' (the later chapters), the student must turn for Mark Sykes' contribution to geographical study, not to Mr. Shane Leslie's biography. This hardly does more than state baldly that he travelled little-known roads, adding on his own authority that he was "dodging war parties all day and making up maps all night." In fact, his mapping did not come to much. His mercurial temperament never allowed him *approfondir les choses*, and long before he had finished anything he would fly off to something else. He could not be a slave of the midnight lamp. Mr. Winston Churchill in his introduction, speaking of Mark Sykes' "novitiate of travel," says that he was "determined to make himself a first-class authority on his chosen part of the world." Probably he formed that determination again and again, but he never carried it through. The great work that he projected on the history of the Caliphate dwindled to a subjective second-hand sketch of little more than half the period, the eminently readable but eminently unreliable work of an unashamed amateur who was delighted to end it there and return to travel talk for the rest of the book. His

best contribution to our knowledge of the peoples that he visited is offered by his lightning caricatures of human types and individuals. He had an infallible and merciless eye for foible, fudge, and fraud ; but also, it should be said, for an essential characteristic of some sort, which he would isolate for caricature. Though he could talk little to Turks, no one has seized better the salient points of Turkish official character or set them forth more incisively. His books are full of such sketches, and his delicious letters are fuller still : but perhaps the best series of these word-paintings is to be found in a certain number of the *Dublin Review*.

In the last years of his life it was given to him to make some history and with it some political geography. If it is certainly true, as he always protested, that he was not the author of the " Sykes-Picot Agreement " in general, he was more responsible than any other Briton for the particular courses which were taken by political frontiers laid down in that Agreement. His lines have been followed in the event, much more than less, so far at least as Syria is concerned, though nothing of his map has been realized in Asia Minor and Armenia. It remains to be seen how long the existing frontier of the French and British zones will respect his memory, and what is to come of those Zionist aims in Palestine, which he approved and fostered. But he had his share in the creation of an independent Hejaz, which seems likely to last, and he was sole author of that parti-coloured flag of Arab Union, which still flies for a symbol of something possibly yet to be. D. G. H.

GENERAL

Egypt and the Old Testament.— **T. Eric Peet, M.A.**, Professor of Egyptology in the University of Liverpool. University Press of Liverpool, Ltd. ; London : Hodder & Stoughton. 1922. 8vo. Pp. 236. *With Two Maps.* 5*s. net.*

The numerous attempts of the past generation of scholars to "illustrate" the Old Testament from Egyptian archæology are sufficient justification for "yet another book on Egypt and the Bible." For in such matters various considerations are always liable to intervene, either to magnify the contributions of monumental evidence to traditional history, or to misinterpret it, however unwittingly. It is therefore no waste of time, but a real service both to specialist colleagues and to the general public, for an Egyptologist of Prof. Peet's standing and reputation to take stock of the results. Probably most of those whose earlier conclusions he finds himself compelled to disallow will concur in his discreet and cautious criticism. The best explorers soonest recognize that they are on the wrong road ; and it is the duty as well as the privilege of the next generation to plot the *cul-de-sac* as well as the through-road.

The only problems here of primarily geographical importance are those of the land of Goshen and of the Exodus—" a happy playing-field for the amateur," as the writer justly says. All that he himself thinks possible now is to recover the route which the compilers of the ninth century B.C. and onwards *thought* that the Israelites followed, " a very different thing " from tracing their actual footsteps ; and he takes the same common-sense view of the topography of the sojourn in Egypt. J. L. M.

The Golden Bough : a Study in Magic and Religion.— **Sir James George Frazer, F.R.S., F.B.A.** *Abridged edit.* 1 vol. Macmillan & Co. 1922. 18*s. net.*

Sir James Frazer has done a great service to the public by preparing this abridged edition of his 'Golden Bough.' The primary aim of that great book

was "to explain the remarkable rule which regulated the succession to the priesthood of Diana in Aricia," where the "King of the Wood" obtained his office by killing his predecessor, and in his turn was slain by the successor who challenged him by plucking the Golden Bough. But, in attempting to solve that problem, the author "was led to consider a number of more general questions in archæology, ethnography, and folklore"; and in the course of thirty years the two original volumes were expanded to the twelve volumes of the third edition—each an encyclopædia, almost, of its subject, with an amazing wealth of extracts and of references to sources. Some of the discussions, in the fullness of their development, led the reader far enough away from the Priest of Nemi; it was becoming hard to see the Arician Grove for the trees: and the cost and size of the series kept many students from possessing it.

To have an abridgment of all this made by Sir James Frazer himself is an undoubted boon. He has made it (as was to be expected) extraordinarily well. While there has been some reduction in the bulk of the evidence cited, the argument has been retained, and is the more easily followed; for notes and references the student is referred to the larger edition. The exposition has been condensed here and there, but without destroying its beauty and clarity. Once more it is possible to read the 'Golden Bough' as a whole, to enjoy it as the great work of art that it is, in its singular beauty and persuasiveness—to warm to Frazer's generous hatred of cruelty and superstition—to appreciate those ironical sidestrokes of half-quotation, too delicate to be called misapplication, by which he drives the unwary reader into the net of his logic.

To ask for an addition to the 'Golden Bough' seems ungratefully unreasonable. But among all the customs that he cites to explain why the runaway slave at Nemi had to break off a branch of the sacred tree, we may perhaps ask why the author says nothing of the rites of "taking sanctuary." At first sight, the "touch wood" of the children's game seems as nearly related as Baldur's mistletoe or Punchkin's parrot to the Golden Bough.

B. A.

THE MONTHLY RECORD

EUROPE

The Growth of Paris.

In the *Geographical Review* for July 1923, M. L. Gallois sketches the history of the growth of Paris, and outlines the present tendencies in the process. Geographical factors, such as the opening out of the Seine valley, the decrease in the gradient of the river, the islands facilitating bridge building, and the southern approach formed by Mt. Ste. Geneviève, determined the position and contributed to a certain degree to the importance of Paris, but its present predominance in France is due to historical causes. Paris under the Capets first put a limit to Norman expansion, and became through the centuries the administrative heart of France. The river valleys which open into the Paris basin, before the construction of canals and railways, made her accessible from most of France. The successive stages in the population's growth are clearly shown by the lines of former fortifications. By the census of 1921, the figure for Paris, within the fortifications of 1840, was shown to be 2,906,472, an increase of only 18,000 on the figure for 1911. Besides the heavy war losses, the migration to the outer suburbs was responsible for this small increase. The only region to show an actual decrease in the decade was, approximately,

that enclosed by the walls of 1789, *i.e.* the heart of the city. On the other hand, the areas of Greater Paris showing an increase of over 50 per cent. lie at a distance of 8 to 10 miles from the centre, along the railway routes. On the right bank, these lie north and east of the line St. Germain-St. Denis-Vincennes; on the left bank, in the direction of Versailles, Sceaux, and Bourg-la-Reine. In the decade 1911–21, the Department of Seine-et-Oise, despite the war, had increased by 104,000, almost entirely through Parisian migration, while that of Seine, excluding Paris, had grown by 239,000, from similar causes. M. Gallois thinks that 4,500,000 would be a moderate estimate of the population of Greater Paris.

Ice in the Kattegat.

A discussion by Dr. Johan Gehrke on the "After-effect of Ice-winters upon the Deep-sea Temperatures of the Kattegat" appears as *Publications de Circonstance*, Nos. 75 and 81 (1922–23), *Conseil Permanent International pour l'Exploration de la Mer*. An "ice-winter" is defined as a winter during which for a longer or shorter time one or more of the lightships distributed from north to south along the deep channel of the Kattegat have to be withdrawn owing to ice, whilst an "ice-free winter" is one in which none of the ships is so withdrawn. The discussion embraces the thirty-nine years, 1880–1918, during which there were thirteen ice-winters, the greater number in the 'eighties and 'nineties, the last being 1916–17, though 1921–22, which was very severe in the Baltic, fell too late to be included. The study is much too elaborate to be epitomized in any detail in a short note, but the following generalizations may be given. As a result of an ice-winter, a temperature deficit in the deep salt water of the Kattegat travels like a wave from north to south, the time of culmination of the deficiency occurring later and later as the wave progresses. In the north the mean deficiency is greatest during the first and second months after the cessation of the ice-period, the mean temperature of the deep water becoming normal again in the fourth month after the disappearance of the ice. On the other hand, in the south as late as in the second month after the end of the ice-period the bottom temperature is frequently about the normal, the greatest mean deficiency being delayed till the fourth month, and the resumption to normal conditions till the sixth month. In the first month in the north and the fourth month in the south the mean deficiency is a little above 1° C., and in the most severe ice-winters the magnitude of the maximum deficiency of temperature in the bottom water is more than 1° C. greater than in the mildest ice-years, the date when this is reached being also more than a month later. The dates are reckoned from the "centre of winter," suitably defined as falling in the middle of the cold period determined by the temperature of the air. The centre has varied considerably in the different ice-winters, but on the average has fallen at the beginning of February. The principal determining agent of the distribution of temperature in the deep waters of the Kattegat during and after ice-winters is the influence which the atmospheric cold exerts upon the salt water of the open Skagerack.

Hemp Cultivation in Italy.

In the July number of the *Annales de Géographie*, M. G. Rolletto gives an interesting account of the history and present position of hemp cultivation in Italy. During the Middle Ages hemp was grown generally to take the place of flax. It, in its turn, has been somewhat displaced by jute. In the nineteenth century, to meet this competition, the general cultivation of hemp was abandoned, and its production confined to those regions, namely, Bologna, Naples,

and Piedmont, most suited to its requirements, which are steady rainfall, deep, loose soil, and a high summer temperature. The Bologna district makes up three-fifths of the total area under hemp in Italy, and here much care and labour are devoted to its cultivation, so that it is the keystone of the economic structure. This localization, which becomes marked during the period 1876–1913, also coincides with the beginning of the export of hemp on a large scale. By the year 1913 Italy was second to Russia alone as a hemp-exporting country. Along with increasing total production has gone an increase in the yield per hectare. Before the war, Germany was Italy's best customer for hemp, but this position is now occupied by Great Britain.

One noteworthy feature of the export trade is the small proportion the manufactured hemp bears to the raw material. This however is likely to alter. With the rest of Europe, Italy has suffered from industrial depression following upon over-production. The effect on hemp has been to decrease the area under cultivation, but it has also stimulated endeavours to get the raw hemp finished and manufactured in Italy before exportation. The export of the raw material was, it may be noted, prohibited by Bologna during the fifteenth and sixteenth centuries, as it brought unemployment to the city and prosperity to her rivals, especially Venice. In the author's opinion, this set-back to Italian hemp cultivation is only temporary, owing to the very favourable conditions for its production which prevail there, and also to the excellent quality of Italian hemp itself.

ASIA

The Japanese Earthquake of September 1.

About noon on September 1, one of the greatest of Japanese earthquakes and of the most destructive known to us occurred in the neighbourhood of Tokyo and Yokohama, entirely ruining the latter city and destroying, totally or partially, 71 per cent. of buildings in the capital. As in San Francisco, fires broke out at once and spread rapidly as the water-mains were injured. Soon after the earthquake, sea-waves swept over the shore districts, flooding the lower parts of Yokohama and Tokyo and completing the destruction of the naval base of Yokosuka and of many villages near the coast of Tokyo Bay. The early estimates placing the loss of life at half a million may be excessive, but it is known that by the 9th inst. 65,000 bodies had been recovered at Tokyo. A first investigation by Dr. Nakamura has shown that there were two foci. One, the most important and the first in action, lies between Oshima and Atami and near the Mitura peninsula, the other near Yokosuka. Among the losses by fire is a large part of the Imperial Library, in which about 700,000 volumes were burnt.

AFRICA

Capital of the Belgian Congo.

We are informed by the Foreign Office that a Belgian Royal Decree dated 1 July 1923, has been issued constituting Léopoldville as the capital of the Belgian Congo. The decree will enter into force on a date to be fixed by the Governor-General of the Congo.

AMERICA

The Texas–Oklahoma Boundary.

In the *Geographical Review* for April 1923, Dr. I. Bowman sets forth in detail the history and recent settlement of the boundary dispute between Texas and Oklahoma. The Red River for 539 miles forms the boundary between the

two states, though until January 1923 the exact line had not been defined. In its course the Red River flows through two climatic zones: rising in the dry region of the High Plains, where the rainfall is variable and violent, it flows eastward to the moister prairies. Here the rainfall is heavier and steadier, so that the river-bed is more or less constant. The upper courses, owing to the varying force of water, the erosion and avulsion of the banks, and the work of the strong winds in shifting large quantities of sand, are continually moving. The problem of the boundary in this region dates from the Treaty between the United States and Spain in 1821, which assigned the river with all its islands to the United States. After the admission of Texas to the Union, there was little friction over the boundary between that state and Oklahoma until the discovery of oil along the valley floor south of Grandfield, Okla., in 1918. The question was now of importance, as some of the richest oil pools lie under the bed of the river itself and the adjacent flood plains. In this region, the river-valley is bounded on the north and south by steep bluffs, its width being about 2 miles. At their foot lie a series of shelving plains, referred to as "fringing bench land," "extraordinary flood-plain," and "ordinary flood-plain." Between the "cut-banks" of the latter, among sandbanks, wind the low-water channels. Texas claimed the southern edge of the main channel as boundary, Oklahoma the northern edge of the Texas bluffs. Some experts advocated the edge of the "fringing benchland," as ensuring reasonable stability. The Supreme Court finally constituted the southern "cut-bank" as the boundary for surface jurisdiction and use. By a further complicated decision, the United States becomes possessed of the southern half of the river-bed. The decision was just as regards Texas; since, however, the medial line and the cut-banks are constantly on the move—so that a well the property of the United States may after a flood become the property of a riparian owner in Oklahoma—further problems must arise.

Geography of Indiana.

Mr. S. S. Visher, in his 'Geography of Indiana' (Separate of Handbook of Indiana Geology, part 1), gives a compact summary of the natural advantages and wealth of that state. The "center of population" of the United States, and the "median point," both lie in Indiana. Crossed by many railroads from east to west, with the Ohio to the south and Lake Michigan on the north, the state is enabled to exploit this proximity of markets. Being for the most part a level glaciated plain, and enjoying a high summer temperature (mean maximum daily temperature, June–August, over 80° F.), with an average rainfall of 40 inches, Indiana is predominantly agricultural. Ninety-one per cent. of the area is in farms, 71 per cent. being under crops, the chief of which are Indian corn, wheat, hay and forage, oats, in that order. Of the wheat produced practically all is marketed, while only 15 per cent. of the Indian corn is exported, chiefly to Chicago. The southern districts are suited for fruit-growing, and here apples, grapes, peaches, and pears are the chief crops.

As a manufacturing state, Indiana ranks ninth; as regards the total products of mines, quarries, and wells, this state came twelfth in the U.S. census of 1920. This industrial development was more rapid in the decade 1910–20 than in the preceding one, as is reflected in the growth of population. In 1920 the population was 2,930,390, an increase of 8·5 per cent. in the decade. Indianapolis was the largest town, with one-ninth of the total population. When due allowance is made for Indiana's comparatively small area, it must be considered one of the leading states in the Union.

AUSTRALASIA AND PACIFIC ISLANDS

The Western Atolls of the Society Islands.

Besides Tubai, whose situation is much nearer to Bora-bora, there are three outlying atolls a hundred miles or so to the westward of the Leeward Group, whose names are *Mopihaa*, *Fenua Ura*, and *Motu One*—the Lord Howe and Scilly of Wallis (1767) and Bellingshausen (1819) of this last navigator, respectively. These atolls were never permanently peopled in historical times, and have long lain ignored by natives and colonists alike until quite recently. In the eighteenth century, and no doubt much earlier, they used to be visited now and again by canoes from Raiatea and Borabora, whose people went there in quest of turtle or pearls, and, especially, to collect the much-prized scarlet feathers of the loriqueets (*ura*) that breed in the scrub. This explains the name of Fenua Ura, "the land of loriqueets," and *Vivini*, the "isle of blue loriqueets," where the *Bounty* called on her last voyage under Christian. Motu One (meaning Sand Cay), the more northerly of the three, was used in remote times as a place of exile for recalcitrant subjects of the ruling chiefs of Borabora and *Raiatea*, just as *Makatea* was by the *Ari'i Rahi* of Tahiti; and the ancient graves and kistvaens of coral rock found on this islet are relics of that practice. It was formerly covered with large timber trees, but has been cleared by degrees and now carries 60,000 young coconut palms recently planted by the enterprise of the local Société d'Agricole. Motu One is a very inaccessible *pied-à-terre*, having no passage into the lagoon fit even for a whale-boat, and a landing is only achieved by a union of good luck and good management, and in the very calmest of weather, on those rare occasions when the swell is moderate. The lagoon at Motu One being very shallow there are no pearl oysters in it and but few fish, some of them poisonous at times; and the resources of the islets it comprises (six in all) are very limited. A bakery has been established on the largest one, and wells sunk, for the use of the labourers now employed there; but the water, which is reached at about 12 feet from the surface, is slightly brackish. Natives from the Tuamotu archipelago drink it readily enough, but not so Tahitians or Raiateans.

Mopihaa and Fenua Ura are somewhat more amenable to habitation; but the fresh-water difficulty there is no less acute. The land on all these atolls is elevated only to some 12 to 16 feet above sea-level, and the soil, if it may be so termed, consists of an admixture of broken coral, calcareous sand, and on the top a proportion of humus derived from the indigenous growth of small timber and other vegetation—an admirable compound for the coconut palm to flourish in, and for the South Sea arrowroot (*Tacca pinnatifida*). Of animal products perhaps the domestic fowl is proving the most adaptable, and, if properly fed and protected from rain, turkeys should also do well. The Société d'Agricole has formed a design to introduce a special breed of sheep from Australia, but whether as the foundation of a local meat supply or for export to Tahiti is not stated. In the number of *L'Oceanie Française* for Mars–Avril last, "X" sums up an account of a recent visit of inspection to these atolls by M. Collombet, the administrator of the Leeward Group, in terms which appeal to the practical colonist as somewhat optimistic, considering the difficulties and the risks to be met. Copra should, of course, be the main product, if the young palms can resist or escape the various blights and insect pests that assail the *cocos nucifera* in the Pacific islands. At Mopihaa there is a passage into the lagoon, but it is very narrow, somewhat tortuous, and obstructed by coral knolls, and shoals to 7 or 8 feet just inside the reef. It might be improved by blasting; but would even then only be fit for motor

schooners or small steamers up to 200 tons burthen and drawing not more than 12 or 13 feet. The lagoon at Fenua Ura is more difficult of approach, even for quite small craft. Mopihaa is the island on whose reef the German raider *See-Adler* was wrecked. B. G. C.

ANTHROPOGEOGRAPHY AND HISTORICAL GEOGRAPHY

Early Arab Navigation of the Indian Ocean.

M. G. Ferrand has lately contributed two articles to the *Annales de Géographie* dealing with the Arabic navigators of the Indian Ocean. The first, entitled "Le pilote arabe de Vasco de Gama et les instructions nautiques des Arabes au XV^{e} siècle," appeared in the number for July 1922; the second, "Les instructions nautiques de Sulaymân al-Mahri (XVI^{e} siècle)," in July 1923. These articles are based upon two Arabic manuscripts in the Bibliothèque Nationale, Paris, the work of Ibn Majid and Sulayman al-Mahri. In the sixteenth century these nautical instructions were translated, with some omissions, into Turkish by the Turkish admiral, Sîdî Ali, to whom the compilation, known as the "Muhit" of Sîdî Ali, was entirely credited (see *G.J.*, vol. 11, p. 76).

M. Ferrand adduces much evidence to support his claim that Ibn Majid not only furnished Vasco da Gama with information as to the navigation of the Indian Ocean, when the latter had reached Malindi in 1498, but actually piloted him across. Ibn Majid seems to have sprung from a sea-faring family, both his father and grandfather having been navigators. The manuscripts consist of a collection of nautical treatises in prose and verse: all the poems are by Ibn Majid, upon whose work, also, Sulaymân has drawn largely. Among Ibn Majid's contributions, the most important was the "Fawâîd," or "Book of useful instructions or foundations and principles of nautical science," dating from 1489–90. An earlier version, the "Hâwiya," in verse, is ascribed to 1462. Others include instructions for ascertaining the direction of the Ka'ba at Mecca from places in the Indian Ocean, and a poem treating of the use of certain stars in navigation. The system of determining position employed by the Arabs has already been noted in the *Journal* (*loc. cit.*). The works of both writers contain a number of maritime itineraries of great accuracy. For instance, 'The support of the Mahra, or the fixing of the nautical sciences,' of Sulaymân, contains chapters on the routes in the regions to the east and to the west of Cape Comorin, extending from the African to the Chinese coast; the islands and the routes along their shores, which include Madagascar, Ceylon, and Java; a list of ports under each parallel of latitude, covering as wide an area; particulars of the two monsoons; and, in conclusion, routes to be followed, and the ten dangers to be avoided by mariners. In discussing the southern extent of Africa, Sulaymân makes the port of Ach-Chajara, considered by M. Ferrand to be the modern Lourenço Marques, the southern extremity, and casts scorn upon the suggestion that islands exist to the south. From the employment of Persian terms, and references to nautical treatises called "rahmanag," M. Ferrand argues that, contrary to the general opinion, the Persians took an active part in the navigation of the Indian Ocean. The Portuguese in their turn made much use of these Arabic itineraries.

GENERAL

A False Report of Changes in the Bed of the South Atlantic.

The *Daily Chronicle*, and probably other newspapers for August 23 and the following days, published a report that great changes in the bed of the

South Atlantic had been discovered by the Eastern Telegraph Company's cable ship. We are informed by the Hydrographer to the Admiralty that there is no truth in the report. He has ascertained from the Eastern Telegraph Company that their cable ship *Britannia* has lately been engaged in repairing a break in the cable, between St. Helena and the Cape, which passes over the well-known ridge where depths rise to 480 fathoms about 800 miles from the Cape on the direct line where the cable is laid, surrounding depths being 2,500 fathoms and upwards.

Honour to Sir Aurel Stein.

We record with pleasure the recent award to Sir Aurel Stein of one of the gold medals of the Paris Geographical Society, which was formally presented at the general meeting of the Society on May 25 last, Mr. Houstoun-Boswall, Secretary to the British Embassy in Paris, receiving it on the explorer's behalf. The presentation was made by Prince Bonaparte, President of the Paris Geographical Society, who in suitable terms expressed the pleasure felt by the Society in bestowing its highest honour to so eminent an explorer.

OBITUARY

Sir Henry Evan Murchison James, K.C.I.E.

SIR EVAN JAMES won his chief distinction as a successful Indian administrator; but he was also distinguished as a geographer. In 1886 he formed and carried out the project of exploring Manchuria, then quite unknown beyond the coast-line and the main trade-routes. He had also in view a romantic quest. In the heart of the great forests which cover the region drained by the upper waters of the Yalu and Sungari rivers, there was reported to be a white mountain with a lake on its summit. To discover this mountain and look down on the lake was James' ambition. He found the mountain. He found the lake on its summit. And from the lake he saw a stream issuing. The lake was the source of the Sungari river, the principal tributary of the Amur. It filled the ancient crater of a volcano.

Other unknown parts of Manchuria he explored and made collections of birds and plants. The results he published in his book 'The Long White Mountain,' which was for many years the standard book on Manchuria, and first revealed to the world the rich natural resources of this now well-known country.

On his retirement from service in India he made many journeys in out-of-the-way though known parts of the world. He was a Cumberland man of strong constitution and devoted to out-of-door life, sport, and natural history. Never having married, his chief enjoyment was to wander about the world collecting birds and butterflies and objects of anthropological interest, and his house at Twickenham was a veritable museum.

Sir James was for three years a member of our Council; but it is somewhat remarkable that no distinction was ever conferred upon him by this Society.

F. E. Y.

36°
37°
38°
33°
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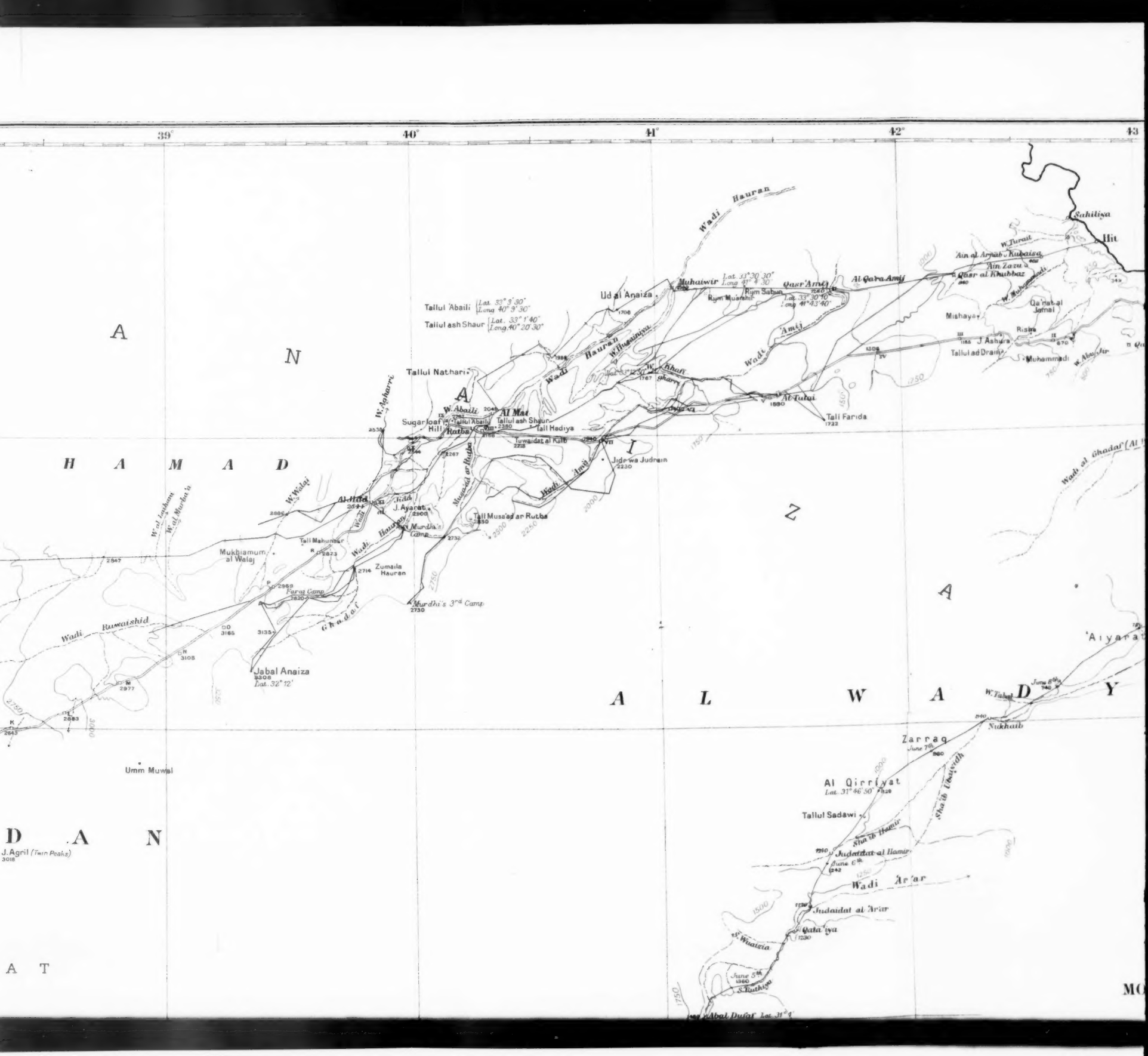
31°
BEIRUT
Rayak
Saida
Nahr el Litani
MEDITERRANEAN SEA
S Y R I A
DAMASCUS
(ESH SHAM)
Mount Hermon
Es Sur
Lake Tiberias
Tiberias
Semakh
Deraa
JABAL DRUZ
Hauran
Harrat ar Rajil
Burqa
Lat. 32° 36' 40"
Tallul Ghusain
Qal 'el Maf'raq
J Washash
J. Ruma
J. Majqama
J. Ashqaf (Umm al Ithm)
Lat. 32° 12' 40"
Nablus
Nahr el Zerka
Samra Lat. 32° 10' 30"
J. Asfar
J. Aritain
Ghadir al Gharib
Tall Fabdawi
Qasr Hallabat
Qasr Hamman as Sarra
Lat. 32° 4' 10" 4
J. Minsaf al Gharbi
J. Minsaf al Sharqi
J. Shayibat
Lat. 32° 1' 30"
T. Misnar
Qala 'Abdul Husain
Es Salt
River Jordan
Amman
Aerodrome
Qurun al Qamuz
J. Hasan
Jericho
Qasr Azraq
Dir al Baidha
Tallul Harim
Tall Taida
Qala Umm Sa'id
Jabal al Mughar
Jabal as Safara
Marma al Durmi
J. Awainidh
Tal Fara
J. Umm Khushaisha
J. Hib
W. Ganab
Qasr Amra
W. Rajil
J. Qurma
Qara Qatafi
Tas Suwaia
JERUSALEM
El Qastal
Muwaqqar
Ziziya
Qasr Kharana
Lat. 31° 45' 10"
J. Shinsana
Tall as Saqar
J. Tibish
J. an Nassala
J. Na'ij
T R A N S - J O R D A N
W. Qatafi
J. Amari
W. Ghudaf
J. Agril
Khan ez Zebib
R U W A L L A
J. Mappal
Qasr Sihati
Kaf
Ithra
Washwash
Qurayyat al Milh
Minwa
Lat. 31° 24' 40"
Long. 37° 24' 30"
Minwa Lat. 31° 23'
Al Ghatti
Qaraqar
Qa' al Milh
El Qutrani
DEAD SEA
A S H A R A R A T
Baidha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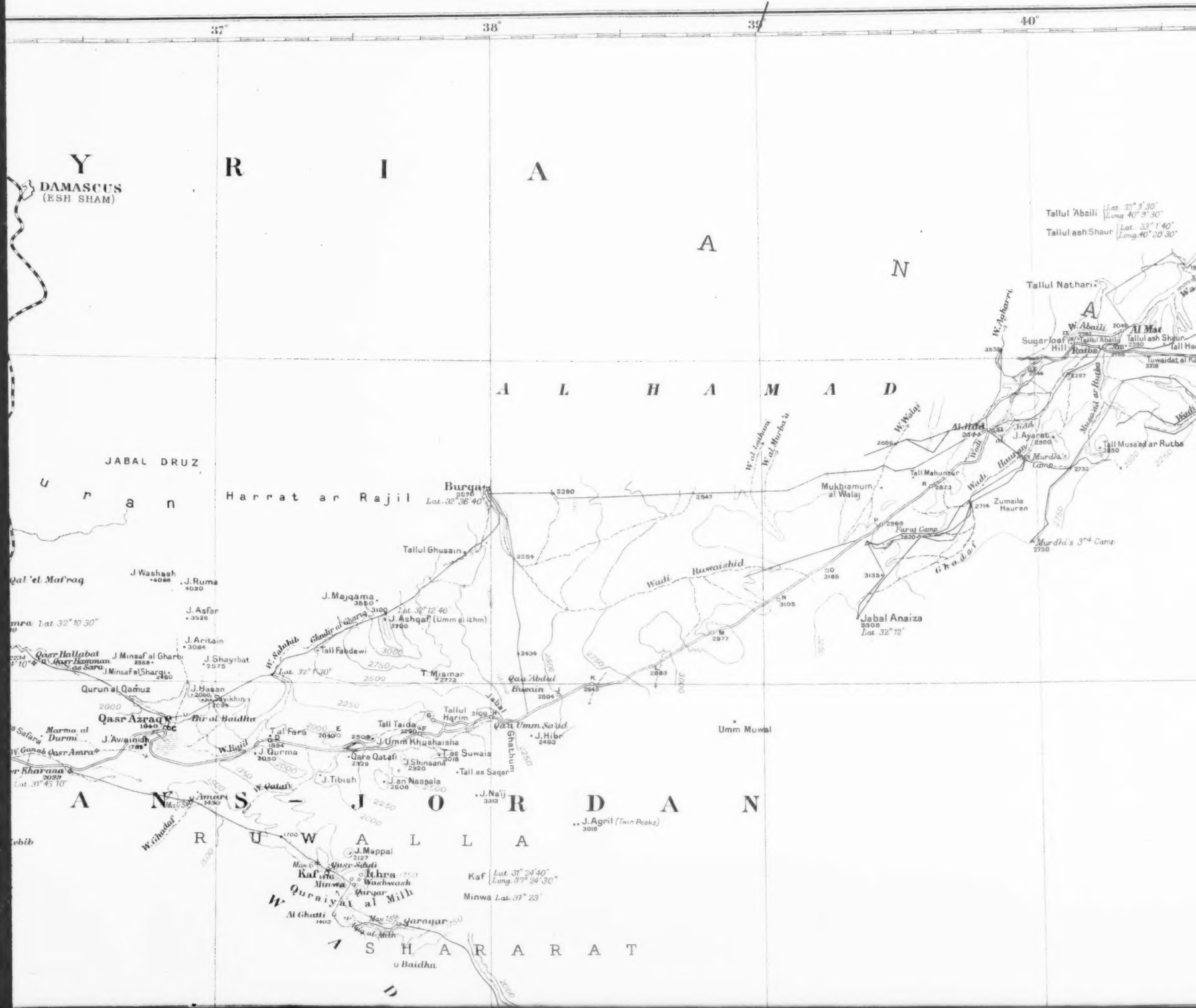
Sahiliya
Hit
W. Turait
'Ain al Arnab
Kubaisa
'Ain Zazu'a
Qasr al Khubbaz
W. Muhammadi
Qa'rat al Jamal
Mishaye
Risha
J. Ashara
Tallul Drain
Muhammadi
W. Abu Jir
Muhaiwir
Lat. 33° 30' 30"
Long 41° 4' 30"
Qasr 'Amij
Lat. 33° 30' 10"
Long 41° 43' 40"
Al Qara Amij
Rijm Sabun
Rijm Muarshi
Ud al Anaiza
Tallul 'Abaili
Lat. 33° 9' 30"
Long 40° 9' 30"
Tallul ash Shaur
Lat. 33° 1' 40"
Long 40° 20' 30"
W. Hugainiya
Wadi Hauran
Wadi 'Amij
W. Khafi
Tallul Nathari
W. Abaili
Al Mat
Tallul Abaili
Tallul ash Shaur
Tall Hadiya
Sugarloaf Hill
Ratba
W. Ajharri
Tuwaidat al Kalb
Jidi wa Judrain
2230
Al-Ruba
J. Ayarat
2900
Tall Musa'ad ar Rutba
Murdhi's Camp
2732
Wadi Hauran
Wadi Amij
Musa'ad ar Rutba
W. Walaj
W. al Lahami
W. al Murdha'a
Tall Mahumar
Mukhtamum al Walaj
Zumaila Hauran
Faraj Camp
Murdhi's 3rd Camp
2730
Wadi Ruwaishid
Ghadaf
Jabal Anaiza
3308
Lat. 32° 12'
Umm Muwal
J. Agril (Twin Peaks)
3018
At-Tubai
1580
Tall Farida
1722
Wadi al Ghadaf (Al
'Ayarat
Nukhaib
Zarraq
June 7th
Al Qirriyat
Lat. 31° 46' 50"
Tallul Sadawi
Shab Hamir
Judaidat al Hamir
June 6th
Wadi Ar'ar
Judaidat al 'Ariar
Qata'iya
W. Wuaisia
June 5th
S. Buthiga
Abal Dufaf
Lat. 31° 9'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(ESH SHAM)
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Lat. 32° 36' 40"
Tallul Ghussain
Wadi Ruwaishid
Jabal Anaiza
Lat. 32° 12'
Mukhtamum al Walaj
Tall Mahunsur
Zumaila Hauran
Faraj Camp
Murdhi's 3rd Camp
Murdhi's Camp
Tallul 'Abaili
Lat. 33° 3' 30"
Long. 40° 9' 30"
Tallul ash Shaur
Lat. 33° 1' 40"
Long. 40° 20' 30"
Tallul Nathari
Sugar Loaf Hill
Al Mat
Tall Musa'ad ar Rutba
Al Hilla
J. Ayarati
Lat. 32° 12' 40"
J. Ashqaf (Umm al Ikhm)
J. Majqama
J. Asfar
J. Aritain
J. Ruma
J. Washash
Qasr Hallabat
Qasr Hammam as Sarra
J. Minsaf al Gharbi
J. Minsaf al Sharqi
J. Shayibat
Lat. 32° 10' 30"
Tall Fandawi
Lat. 32° 1' 30"
T. Misimar
Qurun al Qamuz
J. Hasan
Qasr Azraq
Bir al Baidha
Marma al Durmi
J. Awainidh
Tal Fara
J. Qurma
J. Umm Khushaisha
Qara Qatafi
J. Shinsana
Tall as Saqar
T. as Suwais
J. Tibish
J. an Nassala
J. Nafij
Tallul Harim
Qaru Umm Sa'id
J. Hibr
Ghathum
Umm Muwal
J. Agril (Twin Peaks)
Lat. 31° 45' 10"
W. Rajil
W. Qatafi
W. Ghudaf
W. Sahib
Ghadir al Gharra
W. al Lahama
W. al Murkha'a
W. Waliji
W. Asharra
W. Abaili
Wadi Hauran
A N S - J O R D A N
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Kaf
Lat. 31° 29' 40"
Long. 37° 24' 30"
Minwa
Lat. 31° 23'
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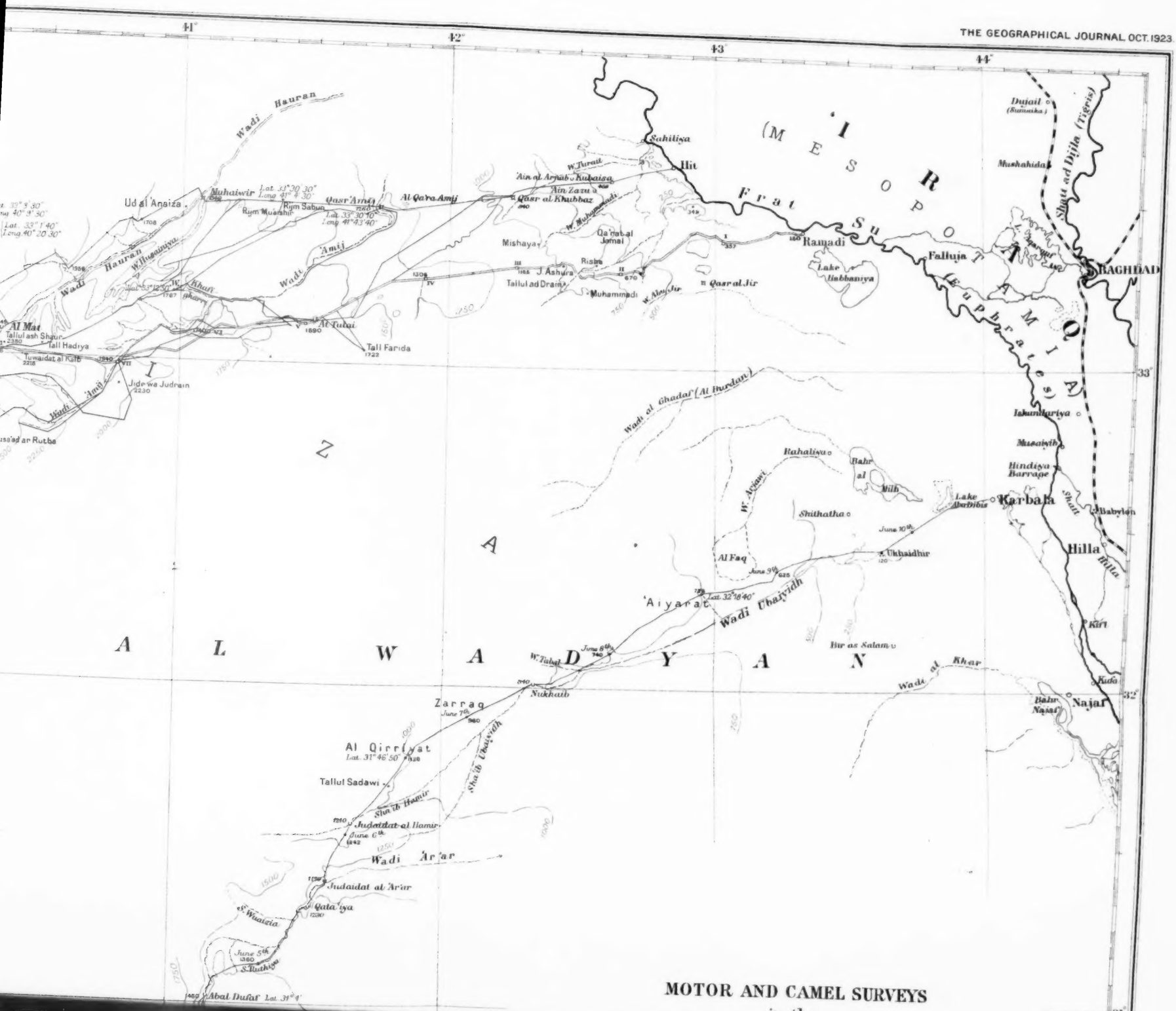
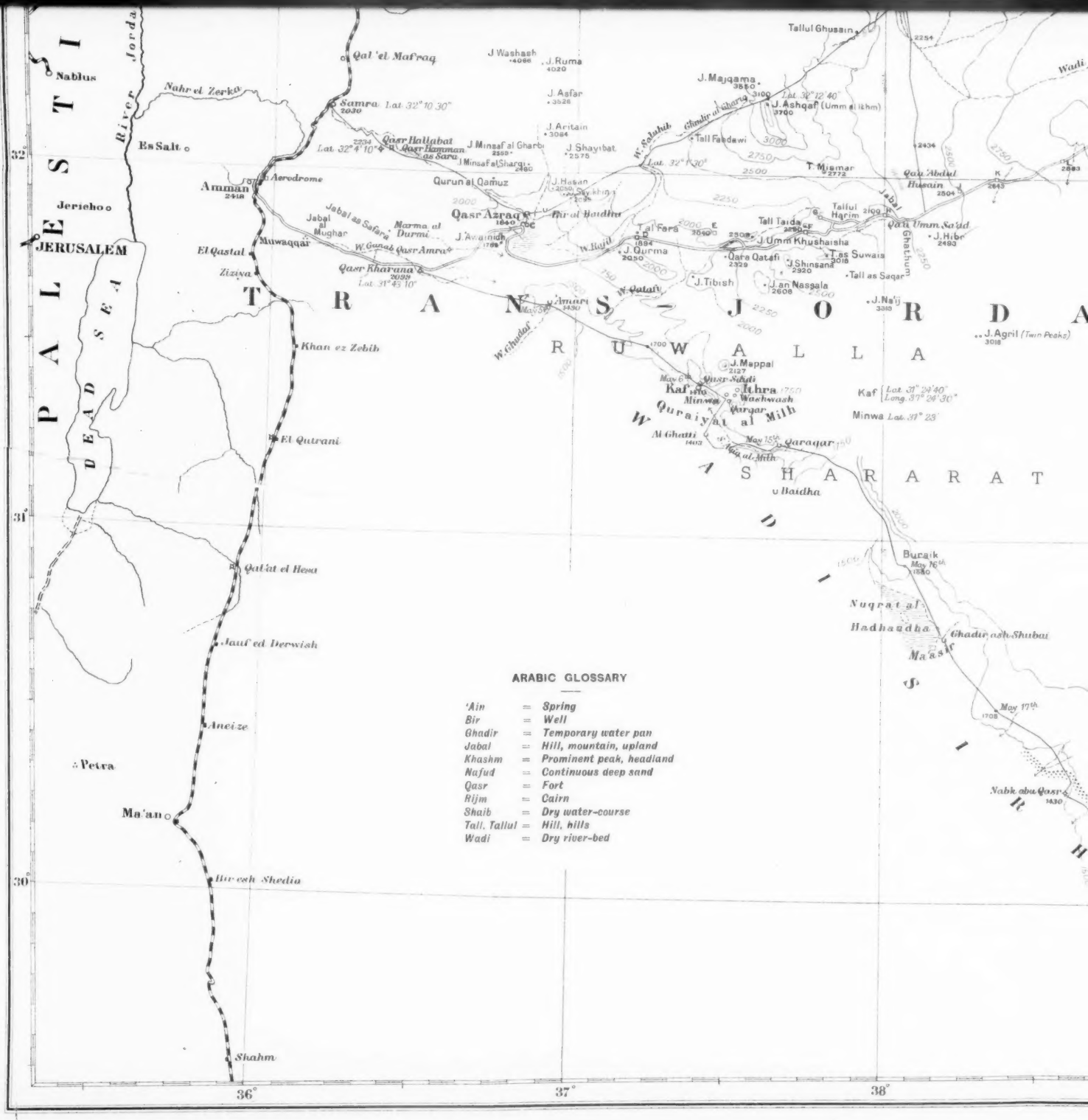
Washwash
Qurqar
Qurayyat al Milh
Al Ghatti
Yaraqar
Bir al Milh
S H A R A R A T
Baidha



MOTOR AND CAMEL SURVEYS
in the


PALESTI
TRANS-JORDA
Nablus
Es Salt
Jericho
JERUSALEM
Amman
El Qastal
Zizya
Muwaqqar
Khan ez Zebib
El Qutrani
Qal'at el Hesa
Jauf ed Derwish
Aneize
Petra
Ma'an
Burak Shedia
Shahm
Qal 'el Mafraq
Nahr el Zerka
Samra Lat. 32° 10' 30"
Qasr Hallabat
Qasr Hamman as Sara
Lat. 32° 4' 10"
Qurun al Qamuz
Qasr Azraq
Jabal al Mughar
Jabal as Safara
Marma al Durmi
W. Ganak
Qasr Amra
Qasr Kharana
Lat. 31° 45' 10"
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W. Amara
W. Qatafi
W. Rajil
Tallul Ghusain
J. Washash
J. Ruma
J. Asfar
J. Aritain
J. Shayibat
J. Minsaf al Gharbi
J. Minsaf al Sharqi
J. Hasan
J. Majqama
J. Ashqaf (Umm al Ikhm)
Lat. 32° 12' 40"
Ghadir al Sharia
W. Sahab
Tall Fadawi
Lat. 32° 1' 30"
T. Misaar
Qasr Abdul Husain
Jabal Harim
Qasr Umm Sa'id
J. Hibr
Tall Taida
J. Umm Khushaisha
Tas Suwais
Tall as Saqar
J. Shinsana
Qara Qatafi
J. Tibish
J. an Nassala
J. Na'ij
J. Agril (Twin Peaks)
J. Mappal
Qasr Nadi
Kaf
Iuhra
Waqwash
Qurqar
Minwa
Lat. 31° 29' 40"
Long. 37° 26' 30"
Minwa Lat. 31° 29'
Quraiyat al Milh
Al Ghatti
Qaraqar
Hadabat al Milh
ASHARARAT
u Baidha
Burak
Nuqrat al
Hadhaadha
Ghadir ash Shubai
Ma'asif
Nabk aba Qasr
Aerodrome
Tall Khirbat
Tallul Harim
Ghadhum
W. Sahab
W. Ghudar
W. Rajil
W. Amara
W. Qatafi
W. Ganak
Jabal al Mughar
Jabal as Safara
Marma al Durmi
Qasr Amra
Qasr Kharana
Qasr Hallabat
Qasr Hamman as Sara
Lat. 32° 4' 10"
Lat. 32° 1' 30"
Lat. 32° 12' 40"
Lat. 31° 45' 10"
Lat. 31° 29' 40"
Long. 37° 26' 30"
Minwa Lat. 31° 29'
May 6th
May 15th
May 16th
May 17th
1700
1750
1780
1708
1430
2418
2030
2234
2050
2460
2575
3064
2772
2504
2643
2883
2434
2254
2127
2329
2920
2608
3018
3313
2490
2100
2250
2050
1894
1788
1640
1403
3100
3700
3550
3000
2750
2500
2250
2000
1750
1500
1250
1000
750
500
250
ARABIC GLOSSARY
'Ain = Spring
Bir = Well
Ghadir = Temporary water pan
Jabal = Hill, mountain, upland
Khashm = Prominent peak, headland
Nafud = Continuous deep sand
Qasr = Fort
Rijm = Cairn
Shaib = Dry water-course
Tall, Tallul = Hill, hills
Wadi = Dry river-bed
32°
31°
30°
36°
37°
38°

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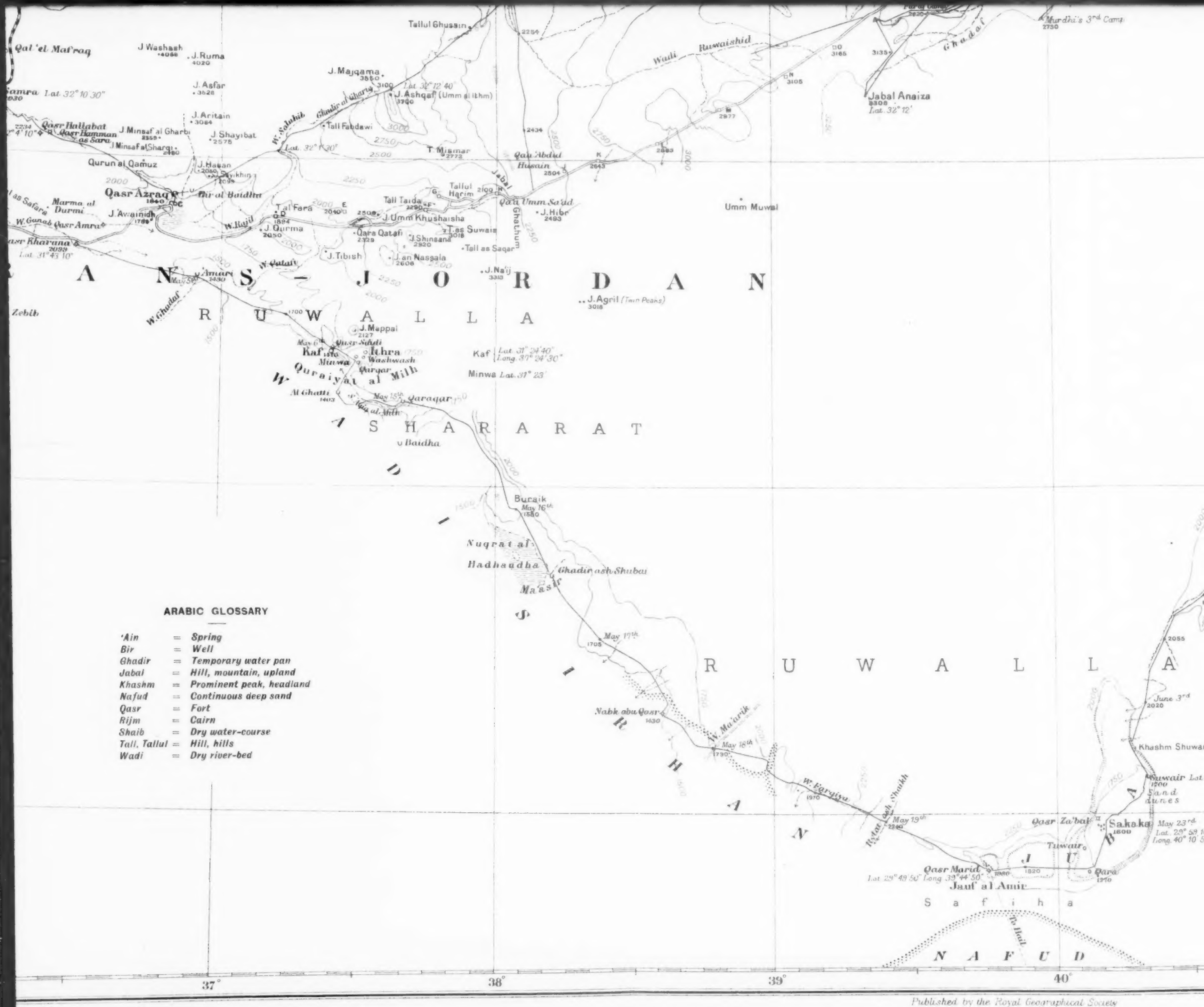

ARABIC GLOSSARY

'Ain	=	*Spring*
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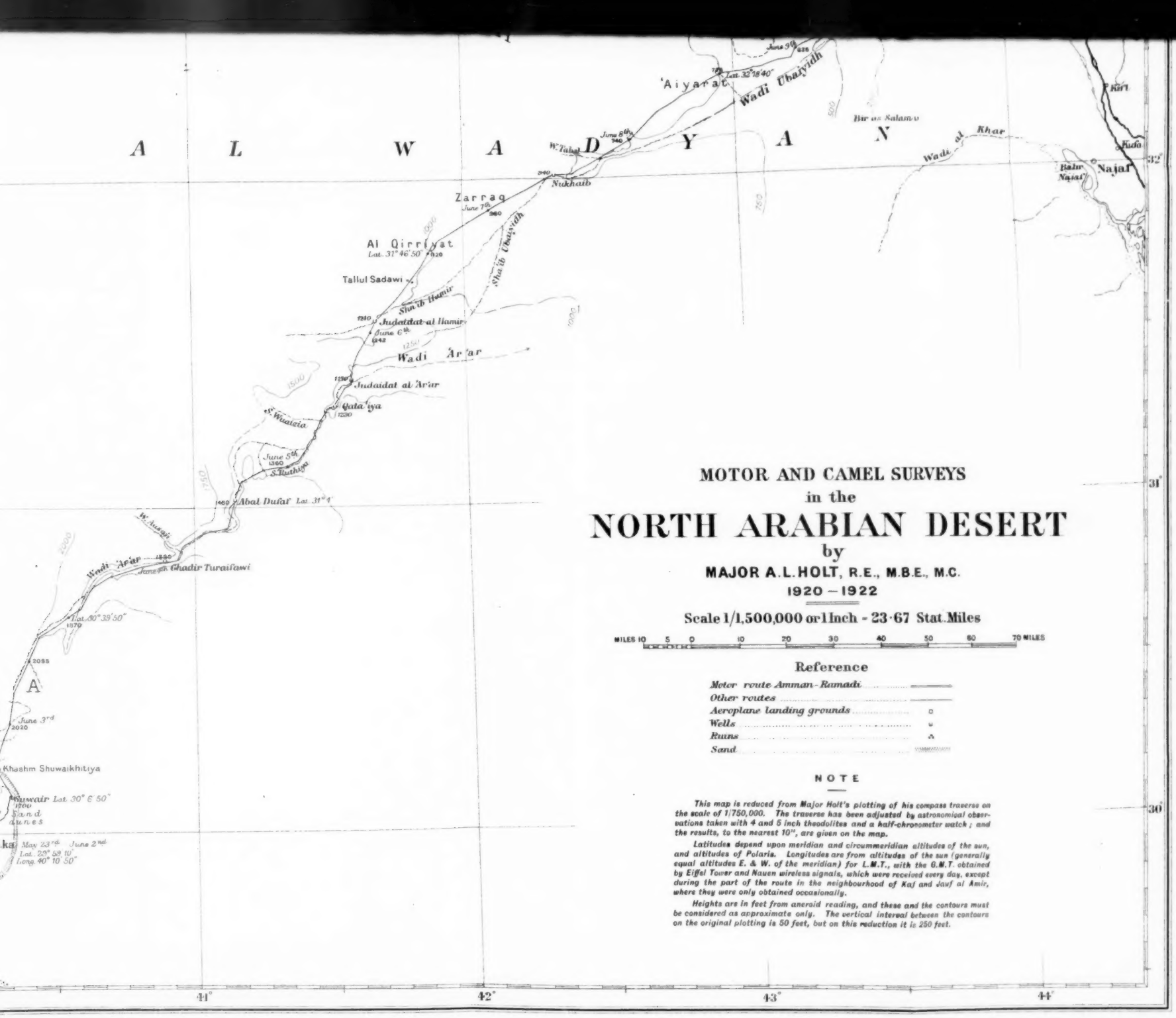


MOTOR AND CAMEL SURVEYS
in the
NORTH ARABIAN DESERT
by
MAJOR A. L. HOLT, R.E., M.B.E., M.C.

1920 — 1922

Scale 1/1,500,000 or 1 Inch - 23·67 Stat. Miles

MILES 10 5 0 10 20 30 40 50 60 70 MILES

Reference

Motor route Amman - Ramadi	
Other routes	
Aeroplane landing grounds	□
Wells	○
Ruins	△
Sand	

NOTE

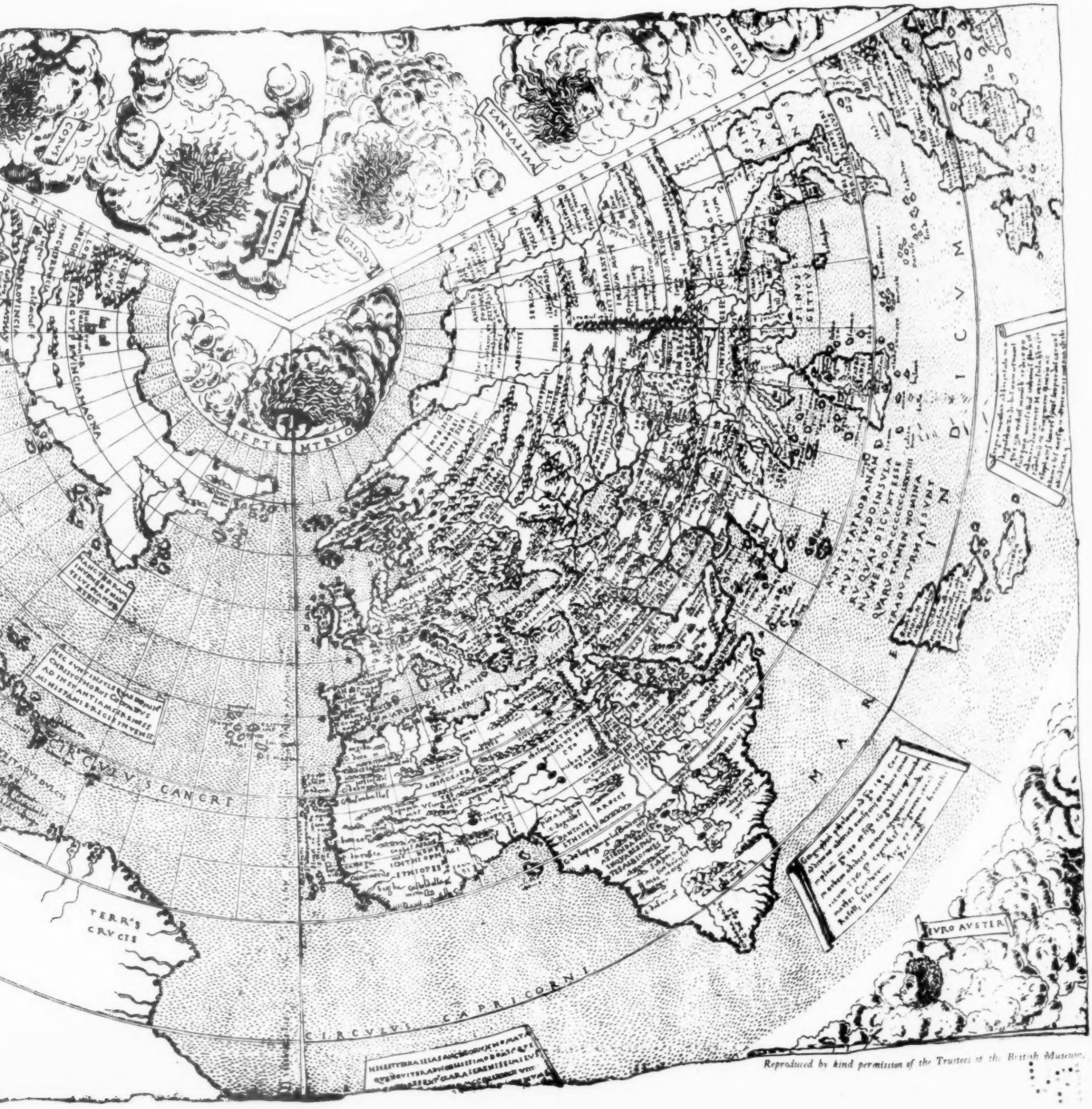
This map is reduced from Major Holt's plotting of his compass traverse on the scale of 1/750,000. The traverse has been adjusted by astronomical observations taken with 4 and 5 inch theodolites and a half-chronometer watch; and the results, to the nearest 10", are given on the map.

Latitudes depend upon meridian and circummeridian altitudes of the sun, and altitudes of Polaris. Longitudes are from altitudes of the sun (generally equal altitudes E. & W. of the meridian) for L.M.T., with the G.M.T. obtained by Eiffel Tower and Nauen wireless signals, which were received every day, except during the part of the route in the neighbourhood of Kaf and Jauf al Amir, where they were only obtained occasionally.

Heights are in feet from aneroid reading, and these and the contours must be considered as approximate only. The vertical interval between the contours on the original plotting is 50 feet, but on this reduction it is 250 feet.

NORTH ARABIAN DESERT.
Philby & Holt.

CIRSATAS PROVINCIA OCCIDENTALIS
LIBOAVSTER



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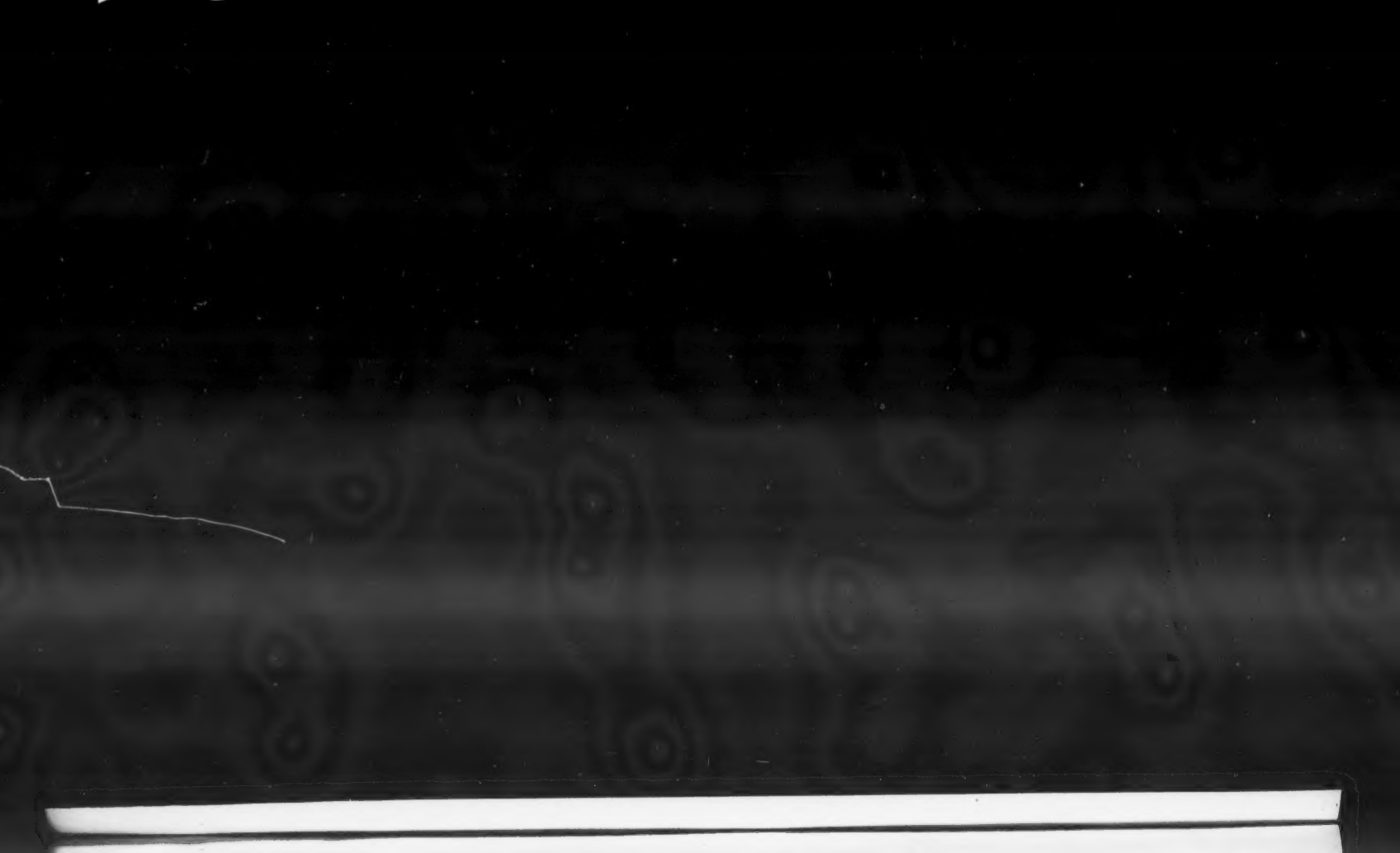
THE CONTARINI-ROSELLI MAP OF A.D. 1506